

REFERENCE

THE PLANNING OF THE MODERN CITY

A Review of the Principles
Governing City Planning

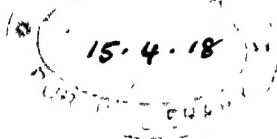
BY

NELSON P. LEWIS

*Member of the American Society of Civil Engineers, the American Society of
Municipal Improvements, the National Conference on City Planning,
the Permanent Association of International Road Congresses,
the American Road Builders' Association, the Municipal
Engineers of the City of New York and
the Brooklyn Engineers' Club Chief
Engineer of the Board of Esti-*

mals and Improvement

(City of New York City)



FIRST EDITION

SECOND THOUSAND

NEW YORK
JOHN WILEY & SONS, Inc.
LONDON : CHAPMAN & HALL, LIMITED

1916

REFERENCE

TO THE
Municipal Engineers
of the United States

THE FIRST MLN ON THE GROUND
IN CITY PLANNING
AS IN CITY BUILDING
IN THE HOPE THAT IT MAY HELP
THEM TO REALIZE THEIR
RESPONSIBILITIES AND OPPORTUNITIES
IN DETERMINING THE MANNER
IN WHICH OUR CITIES
WILL DEVELOP
THIS VOLUME IS DEDICATED
BY
The Author

REFERENCE

CONTENTS

	PAGE
LIST OF FIGURES AND DIAGRAMS IN TEXT	vii
LIST OF SUBJECTS ILLUSTRATED BY PLATES	xi
LIST OF TABLES	xv
CHAPTER	
I. INTRODUCTORY	1
II. THE CITY PLANNING MOVEMENT	8
III. THE CORRECTION OF MISTAKES	27
IV. ELEMENTS OF A CITY PLAN	44
V. THE TRANSPORTATION SYSTEM	54
VI. THE STREET SYSTEM	86
VII. PARKS AND RECREATION FACILITIES	130
VIII. PUBLIC BUILDINGS AND CIVIC CENTERS	149
IX. THE ECONOMIC VALUE OF A CITY PLAN	175
X. THE INDUSTRIAL TOWN OR DISTRICT	186
XI. STREET TRAFFIC	200
XII. STREET DETAILS—UTILITY AND ADORNMENT	220
XIII. THE RAILROAD IN ITS RELATION TO THE STREET SYSTEM	247
XIV. RESTRICTIONS	260
XV. THE ENVIRONS OF THE CITY	286
XVI. GARDEN CITIES	299
XVII. CITY PLANNING LEGISLATION	320
XVIII. PROGRESS AND METHODS	338
XIX. FINANCING A CITY PLAN	359
XX. MUNICIPAL LAND POLICIES	389
XXI. THE OPPORTUNITIES AND RESPONSIBILITIES OF THE MUNICIPAL ENGINEER	404
SOURCES OF INFORMATION	413
INDEX	415

LIST OF ILLUSTRATIONS

FIGURES AND DIAGRAMS INCLUDED IN THE TEXT

FIGURE	PAGE
1. Plan showing the cutting through of a new street to form a traffic artery in New York	38
2. An overbuilt block in Boston and proposed remedy	40
3. The Minetta street problem in New York	41
4. Successive additions to Los Angeles	65
5. The Trunk Line railroads entering Chicago	69
6. Location of terminal passenger stations in Chicago	70
7. Proposed simplified plan for railroads entering Chicago	71
8. The railroad terminals of New York	73
9. Proposed marginal railroad along the Brooklyn waterfront	75
10. Location of the Pennsylvania Station and terminal yard and the New York Central Station, New York	77
11. Cross section of boulevard 200 feet wide, with elevated railroad on masonry structure	79
12. Open cut for rapid transit railroad in street 100 feet wide	80
13. Open cut for rapid transit railroad in street 150 feet wide	80
14. The Wren plan for rebuilding London after the Great Fire	92
15. The Evelyn plan for rebuilding London	92
16. Principal traffic streets of Paris	95
17. General street system of the central part of Cologne	96
18. Principal traffic streets of Rochester, N. Y.	99
19. Plan proposed for Detroit in 1807	100
20. Principal traffic streets of Detroit at the present time	101
21. Street to include narrow and crooked road	104
22. Existing radial thoroughfares of Boston	105
23. Fragments of circumferential thoroughfares of Boston	106
24. Development of an arterial street system based upon existing roads	107
25. Different methods of treating offsets and irregular street junctions	112
26. General plan showing the street system of Essen	113

FIGURE	PAGE
27. An old established center ignored in developing the street plan of Brooklyn	116
28. Disregard of existing improvements in laying out a rectangular street system	117
29. Subdivision of an irregular block by introducing an interior court . .	120
30. Triangular area subdivided in the conventional manner by streets 60 and 80 feet wide	124
31. An alternative subdivision of the same area by streets 40 and 50 feet wide	125
32. Changes in the subdivision of a typical block in New York	127
33. Method employed in Philadelphia in subdividing a large block into three smaller blocks	128
34. Semi-detached houses served by a central heating plant	129
35. Parks and parkways of the Metropolitan District of Boston	137
36. Palisades Interstate Park system	144
37. Location of a monumental building with respect to grades of approaching streets	152
38. Location of the Pennsylvania Station and Post Office, New York, with respect to the street system	154
39. Location of Grand Central Station, New York, with respect to the street system	154
40. Plan of express track level, Grand Central Terminal, New York . . .	156
41. Plan of suburban track level, Grand Central Terminal, New York . .	157
42. Location of Union Station, Washington	159
43. Location of principal railway station, Frankfort	160
44. Proposed location of new courthouse, New York	163
45. Plan of San Francisco civic center	165
46. Area of benefit for acquiring Central Park, New York	179
47. Area of benefit for acquiring Prospect Park, Brooklyn	180
48. Plan of Gary, Indiana	190
49. Gyratory system of traffic regulation at Columbus Circle, New York .	215
50. Proposed adaptation of the gyratory system of traffic regulation to a rectangular intersection of two streets with roadways 55 feet wide .	216
51. Examples of the subdivision of exceptionally wide streets	229
52. An instance of excessive provision for roadways in a very wide street to the exclusion of parking features, and proposed modification .	231
53. Section showing sub-surface structures in Broadway, New York . .	233
54. Location of three railroad bridges crossing a boulevard 200 feet wide within a distance of about half a mile and all at different angles .	258
55. Showing typical regulations governing character and use of buildings which are imposed upon specific areas in Leipzig	272

FIGURE	PAGE
56. The system of radial highways leading out of Philadelphia	292
57. The State highway system of New York	295
58. A county road system in Ohio	296
59. Plan of Forest Hills Gardens, New York	310
60. Plan of a suburban development in the outskirts of San Francisco . .	314
61. Diagram showing proposed distribution of the cost of acquiring streets of different widths	371
62. Diagram showing a method of grading assessments for benefit . . .	372

SUBJECTS ILLUSTRATED BY PLATES

PLATE	PAGE
1. The skyline of lower Manhattan Island, New York, at four different periods	12
2. Views showing tall buildings and narrow streets of New York . . .	13
3. Plan of the Strand-to-Holborn Improvement, London	42
4. General features of the plan for the new Indian capital at Delhi . . .	43
5. The Pittsburgh "Hump" (upper), a portion of the harbor of Hamburg (lower)	58
6. The harbor of Duisburg-Ruhrort (upper), Plan for the improvement of Jamaica Bay, New York (lower)	59
7 Two views of the waterfront of Rio de Janeiro	66
8. Grand Central Station, New York, and its underground connections .	67
9. The New York Connecting Railroad and the Hell Gate Bridge . . .	74
10. Two views of the elevated rapid-transit railroad in Queens Boulevard, New York	78
11. The railway terminals of Berlin (upper); Lower Broadway, New York, under which a four-track rapid-transit subway is being constructed without interference with the street traffic (lower)	79
12. Two views showing the construction of a double-deck rapid-transit railroad under a busy street	82
13. A double-deck, four-track, rapid-transit subway with the steel erected .	83
14. View of William street, New York, under which a double-track rapid-transit subway is being built	86
Plan for Canberra, the proposed capital city of Australia	87
A typical section of the plan of Paris, showing the arrangement of streets and boulevards (upper), Plan showing the over-intensive use of land in Charlottenburg (lower)	110
Three examples of curved streets	111
A depressed central heating plant, using the chimney of an adjacent church (upper); View of the site of Canberra (lower)	132
Plan of the parks and parkways of Kansas City	133
The boulevard system of San Francisco	138

PLATE	PAGE
21. The system of parks and connecting parkways in the Borough of The Bronx, New York	139
22. Prospect Park, Brooklyn, and the parkways leading from it	140
23. Two views in Toronto's wild park	141
24. The Kensico Dam in New York's water supply system	146
25. Two typical views of the Bronx River, New York	147
26. Views of the Charles River waterfront, Boston, before and after the creation of the Charles River Basin	150
27. The proposed grouping of public buildings in Washington, view looking east	150
28. The proposed grouping of public buildings in Washington, view looking west along the Mall	151
29. The Monroe Palace in Rio de Janeiro (upper); A railroad office building and freight house at Albany, New York (lower)	151
30. The New York Public Library at night and detail showing fountain . .	152
31. Grand Central Terminal in New York in 1906 when operated by steam .	153
32. Two views of the Grand Central Terminal, New York, in 1915, after reconstruction and the abandonment of steam operation	15
33. Park Avenue, New York, looking north from the Grand Central Terminal	15
34. The Forty-second street front of the Grand Central Station, New York	15
35. The Union Railway Station in Washington (upper); the Union Railway Station in St. Louis (lower)	1
36. The Municipal Office Building, New York, with street passing under it .	1
37. The Municipal Office Building and the Woolworth Building, New York, as each is seen from the other	1
38. Proposed circular courthouse for New York (upper); The civic center at Springfield, Mass. (lower)	1
39. The Cleveland group plan	1
40. View of San Francisco's civic center (upper); An old aqueduct in Rio de Janeiro (lower)	
41. Two examples of high-school buildings in New York	
42. A "bungalow" fire-engine house in Portland, Ore. (top); Entrance to the Santa Fe Railroad Station at San Diego, Cal. (middle); Railroad station at Barstow, Cal. (bottom)	
43. Plaza at main entrance to Prospect Park, Brooklyn	
44. General plan of Fairmount Parkway, Philadelphia	
45. The Cambridge Bridge over the Charles River at Boston	
46. High Bridge, New York	
47. Washington Bridge, New York	

PLATE	PAGE
48. Waterfront of Rio de Janciro with sewage pumping station (upper); A sewage treatment plant at Essen-Nord (lower)	178
49. Aerating fountains at the Ashokan Reservoir in New York's water supply system	179
50. Concrete bridge over a ravine at the upper end of the Ashokan Reservoir.	190
51. Plan of an industrial town near Duluth	191
52. Workmen's houses in the industrial town near Duluth (upper); cottages in Colony Gewerkschaft, Emscher-Lippe (lower)	196
53. Cottages in Colony Altenhof, Essen	197
54. Typical houses for workmen in Colony Alfredshof, Essen	204
55. Plan of Colony Gewerkschaft, Emscher-Lippe (upper); Plan of Colony Alfredshof, Essen (lower)	205
56. Plans showing the tramway system and the omnibus routes of central London	210
57. Parking automobiles on one side of a street in Seattle (upper), Un-symmetrical arrangement of a street in Essen (lower)	211
58. Another example of the treatment of streets in Essen (upper); A wide sewer inlet in Pasadena (lower)	227
59. Fifth Avenue, New York, on Easter Sunday	223
60. Examples of effective street lighting and ornamental lamp standards .	242
61. Some examples of lamp standards to be found in towns on the Pacific Coast	243
62. Views showing the lighting of Fifth avenue and the high office buildings of lower Manhattan, New York	244
63. The Boston State House at night and the battery of lights by which it is illuminated	245
64. Two examples of the flood lighting of public buildings: Public Library in Lynn, Mass. (upper); City Hall in Waterbury, Conn. (lower) . .	246
65. Examples of the illumination of towers	247
66. Two views showing the effect of placing trees on the street line instead of the curb line	250
67. Two details showing the character of development at Forest Hills Gardens, New York	251
68. Entrances to a suburban development near San Francisco	252
69. Entrances to two of the St. Louis "places"	253
70. Entrance to and view of Hortense Place, St. Louis	254
71. Arcade along the Rue de Rivoli, Paris (left); Front yards in Berlin (right)	255
72. A well-shaded street in Redlands, Cal. (upper); Roses in a street in Portland, Ore. (lower)	258
73. The Stockton Street Tunnel, San Francisco	259

PLATE	PAGE
74. Bronze base of one of the flagstaffs in front of the New York Public Library (upper); A bridge carrying a railroad over a street in Philadelphia (lower)	260
75. Views showing the elimination of a grade crossing by raising the railroad and lowering the street	261
76. Views showing the elimination of a grade crossing by elevating the railroad and retaining the street level	268
77. Views showing the elimination of a blind grade crossing by straightening the highway	269
78. Two railroad bridges across Queens Boulevard, New York	270
79. Views showing encroachments upon Broadway, New York, and the improvement caused by their removal	271
80. Examples of the obstruction of public streets in Vienna	294
81. Two views along the Columbia Highway in Oregon	295
82. Views along the Columbia Highway	298
83. Snapshots taken along the Columbia Highway	299
84. Publishing plant of Doubleday, Page & Company at Garden City, New York	310
85. Plans of two typical English garden cities	311
86. Views of "Station Place," Forest Hills Gardens, New York	314
87. Plan of, and view showing cottages erected at, Billerica Garden Suburb .	315

LIST OF TABLES

TABLE	PAGE
I. Rate of increase of urban and rural population in the United States from 1900 to 1910	20
II. Increase in population of typical German and American cities from 1880 to 1910	21
III. Estimated cost of constructing double-track railroads of various types under, upon or above the surface of city streets under different conditions	85
IV. Relative cost of development of the same area under different methods of subdivision	126
V. Park statistics of various cities	132
VI. Distribution of parks in New York according to Boroughs	134
VII. Number of licenses issued by the London Metropolitan Police for cabs, omnibuses and tram cars from 1903 to 1912, inclusive	208
VIII. Relative obstruction caused by different vehicles, as estimated in London	210
IX. Fatal accidents in streets of the six largest cities during the year 1911 .	211
X. Areas and dates of the several additions to Los Angeles	294
XI. Some statistics of English garden cities	305
XII. Increase in land values in New York, from 1899 to 1913	402

The Planning of the Modern City

CHAPTER I

INTRODUCTORY

IS there any occasion for another book on the general subject of City Planning? A number of volumes devoted to this subject have been published under various titles, while many reports dealing with specific conditions and localities afford excellent illustrations of the manner in which city planning problems may be approached and solved. These reports often contain more valuable suggestions than are to be found in books which attempt to cover the entire field and to lay down fundamental principles rather than deal with concrete examples. This being the case it may be asked: "Why make another contribution to a field so fully covered?" The answer is that the present volume is to be devoted almost entirely to the engineering aspects of city planning, or to city planning as an engineering problem or group of problems. It is the hope of the author that municipal engineers will find the following pages of some value in bringing to them a somewhat keener realization of their part in, and responsibility for, the constructive work of city planning as well as city building. Most of the literature of this subject has been contributed either by architects, who emphasize its architectural or artistic side and appear to consider it an architectural problem, or by students of city government, who seem to regard it as an administrative problem. This volume is just as frankly written with the idea that the fundamental problems of city planning are, and from their very nature must be, engineering problems.

Subjects will be discussed that are not generally considered as falling within the scope of the engineer's activities, but they are all subjects with which one who is responsible for the development of the city plan should be familiar. Perhaps the most important characteristic of any design should be its adaptability to altered conditions. If this be true with respect to a building, an industrial plant, a railway or shipping terminal which can be enlarged or replaced or even moved to another location, it is much more important in the case of the ground plan of a city, which cannot be rearranged or transferred to another place. There is no undertaking, therefore, which demands more careful study of what has happened elsewhere, what is likely to happen in a particular place, and the development of tendencies which are sure to result in changes in the methods of living and conducting business, than the working out of the general plan for a city or for the successive additions to an existing city.

The books and periodicals devoted to city planning are not only agreeable reading, but are instructive and valuable contributions to the literature of the subject. They are profusely illustrated with plans of ancient cities and pictures indicating how they must have appeared in their day, and with numerous views of many of the world's greatest and best-known buildings or groups of buildings, some of which have done duty in nearly every book yet published upon this subject. Such illustrations will be very sparingly used in this volume, or will be conspicuous by their absence. Photographs will be used, not because they are attractive pictures which would add interest to a book of travel, but in order to illustrate the effect of a certain plan, treatment or policy discussed in the text. The preference will on the other hand be given to diagrams and plans which, while they may not make as strong an appeal to the casual reader who turns the pages, will indicate what has more recently been done and what is being planned and executed at the present time, and which will make more clear the purpose of the author and speak more convincingly to those whom he is most desirous of reaching. The accomplishments of those who built ancient

Palmyra, Cyrene, Athens and Rome are well worthy of admiration and may be an inspiration to the municipal engineer who is responsible for modern city planning, but he will make a mistake if he uses them as models. In many of the cities of antiquity there were superb buildings, or groups of buildings, or impressively beautiful and dignified approaches to or connections between them adorned with colonnades and arches which were masterpieces of architectural design, but the plans of the cities themselves were rigidly rectangular, with exceedingly narrow streets, and are examples of the very thing we are now trying to avoid in city planning. The forums of these cities were excellent examples of the effective grouping of temples and public buildings; they were the show places of the city; each was a small unit of the city plan and as such they were admirable. They were not connected with each other, and each seems to have been located without regard to the general city plan, but rather to have been designed to emphasize the power and glory of a particular period or individual. The model of Imperial Rome in the fourth century, exhibited at the Salon des Artistes Françaises in 1913 by M. Bigot, was much admired and was undoubtedly of great architectural and archæological value and interest, but it illustrates very forcibly the fact that these units were put down wherever a place could be found for them, and that they were not parts of a general plan for the entire city and could not, therefore, be called good examples of city planning in the modern sense.

Interesting as may be these old plans and their restoration on paper, and profitable as their study may be to the architect, they offer little valuable suggestion to modern city planners unless it be a caution against a concentration of effort to produce a grand climax at the expense of the rest of the city. The conspicuous feature of the twentieth century city and its organization is the consideration given to provision for the health, comfort, convenience and recreation of all of the citizens, the rich and the poor, the dweller in the finest residential district and the denizen of the slum, although it is conceded that the

modern city should have no slums. In the ancient cities the plans of which are most studied, the number of free citizens whose interests were deemed worthy of consideration was very small in comparison with the slaves who made up the great bulk of the population, but who had no rights and were thought to be entitled to little regard; yet art and architecture flourished. The members of the smaller ruling class thought nothing too fine for their city, and we, in our admiration of the masterpieces they created, forget how the submerged nine-tenths lived and the small consideration shown for them. In view of the vastly different conditions which exist to-day, when the welfare of the submerged fraction, be it large or small, is one of the chief concerns in city planning and administration, it is obviously unwise to look to the alleged restorations of these ancient cities for illustrations of the fundamental or constructive work of city planning or the work which would naturally be done by the engineer.

Other sources quite generally drawn upon by writers on city planning are the medieval cities of Europe, more particularly those of Germany, France and northern Italy, the chief buildings of which, castles, churches and town halls, are often so effectively grouped about squares or "places" which are now considered masterpieces of city planning. Mr. Raymond Unwin observes that the charm of these old towns is not due to the better plan of their streets, but to the dignity and individuality of the buildings. The object seemed to be to do work well and that it should look well when done. Time has mellowed the colors and sagging beams have relieved the angularity. Compared with the modern suburb with its freedom to do as each likes, and with the obvious lack of serious effort to adapt each building to its site and surroundings, these old towns are beautiful. But the social conditions prevailing in such towns at the time these much admired "places" or groups were created, while far better than those in the cities of antiquity, were very different from those which must be provided to-day. It is true that efficient administration has effected an adaptation of

these old plans to modern social conditions, has preserved the old and has made the new conform with it to such a degree as to preserve the character of the town and the local color without impairing or curtailing the rights or the enjoyment of the masses other than to such a degree as is necessary to prevent abuse of or injury to public or private property, a lesson which it appears very difficult to impress upon those for the betterment of whose condition most writers on city planning appear to be chiefly concerned. This is conspicuously the case in the United States, where citizens of foreign birth and descent, who have some knowledge of the municipal administrative methods and accomplishments in the Old World, are insistent in their demands that the same things be done in American cities, but are at the same time indignantly resentful of the restrictions upon the use of private property or even the improper use and occupation of public streets, parks and buildings, which are so rigidly enforced in the cities of their native lands and upon the enforcement of which the attainment of these results are in large degree dependent.

While some of the illustrations of the subjects discussed have been drawn from European and South American cities, most of them are taken from those of the United States, and it may be thought that New York and other eastern cities are given undue prominence. This does not mean that conspicuous progress in the solution of city planning problems has not been made in other cities. In fact, some of the most notable undertakings and accomplishments of this kind have been in the smaller towns of the interior, where the people appear to be more ready to appreciate a new idea, to realize a change in conditions and to adopt and carry out plans for readjustment than is the case in the more conservative towns along the Atlantic Coast. While most of the literature of the subject, even that produced by American writers, abounds in references to and illustrations of the cities of the Old World, and while some of these writers appear to believe them to be the only models worthy of being followed and that American cities can best be used as examples

of what should be avoided, the author is convinced that the cities and towns of the Western World afford very many examples of sane and reasonable planning as well as of the things that should not be done. Perhaps more of the text and illustrations would have been devoted to the cities of Europe had it not been for the difficulty of securing reliable data at the time these pages were written. Then, too, the fact that the countries which have contributed so much that is admirable and worthy of imitation in city planning, and especially in city administration, have for the time abandoned their constructive work to engage in one of destruction, that many of the public squares which have been so much praised and so freely drawn upon for illustrations are now littered with the ruins of the imposing buildings, churches, libraries, universities and town halls, which surrounded them and gave them their character and distinction, makes one somewhat reluctant to speak about them. When the war frenzy shall have passed and the period of reconstruction and readjustment shall have arrived there will be an opportunity to see how those people who have won the praise of the world as city planners and builders will go about the task of rebuilding that awaits them, a task rendered especially difficult by reason of the impoverished condition and the exhaustion which will follow this carnival of waste and destruction. It will be interesting to see to what extent an effort will be made to reproduce the old, picturesque effects with some of their attendant inconvenience and to what extent changed commercial and economic conditions will prompt an adaptation to modern methods of living and conducting both public and private business.

While it would be unfair and misleading to say that much which has been written on the subject of city planning is inaccurate, it is true that much has been presented on hearsay, and statistics have frequently been given that are obviously incorrect or at least misleading. They were undoubtedly thought to be entirely trustworthy and to verify them would have involved much time and trouble, a fact of which the writer of these pages has been made painfully aware. Some writers

have indulged in savage criticism of what they have observed or been told about conditions in other countries or cities, much of which is due to misunderstanding or misinformation, and they appear to derive more satisfaction from denunciation than from commendation, yet some of these conditions and practices, while at variance with the ideas of the critic, may be fully justified by the circumstances.

Much information must be secured at second hand or by correspondence. When inquiries are addressed to foreign cities either they or the replies to them are frequently misunderstood, but, after making an effort to secure pertinent information, the temptation to use such as may be obtained, even though not entirely satisfied as to its complete accuracy, is very strong. It is not improbable that in some cases the data given in the following chapters may be found to be somewhat incomplete or defective, but the author has made every effort to insure their accuracy, and, where believed to be doubtful, statistics which it was desired to include have been omitted. An effort has been made to distinguish between facts and opinions, and, where opinions are given, they are not presented as conclusions which settle questions under discussion. Where the opinions or conclusions of others or data compiled from them are used, the authority for them has been stated, but in going over the literature of any subject it frequently may happen that such opinions or conclusions coincide with those which one has already formed, and the expression of them may conform so closely with the language used by others that the reader may think that they have been appropriated without credit. In some cases the opinions of leading authorities may have been so often quoted and accepted that one comes to believe that they were his own from the beginning. If such instances occur in this volume it is the hope of the author that they will be attributed to the influence which the master exercises upon the student, and of which the latter is sometimes unconscious, and not to a disposition to appropriate the ideas of others and put them forward as his own.

CHAPTER II

THE CITY PLANNING MOVEMENT

THE wide interest in city planning which has lately manifested itself all over Europe and America indicates quite clearly that it is a subject in which the people generally are interested; not only those who live in large cities, which may undertake some costly and pretentious schemes of improvement, but dwellers in the small towns and even villages are eager for information upon the subject and are ready to devote their time and energy to the study of plans to make their communities more orderly and attractive. Conferences and exhibits are frequent and largely attended whether in Europe or America, books and magazine articles upon the subject appear at short intervals, and one quarterly publication is devoted exclusively to the subject of "Town Planning." The National Conference on City Planning of the United States holds annual meetings which bring together large numbers of engineers, architects and landscape architects, who may be called professional city planners, together with city officials and others who have shown keen and intelligent interest in the subject, and the British Town Planning Institute, more recently organized with headquarters in London, holds frequent meetings for addresses and discussions. A great international town planning conference was held in London in 1910 and others, less international in character, have been held in Berlin and Leipzig. At the Congress of Cities in Ghent, in 1913, much attention was given to the subject, and a special exhibition of town planning, organized by Professor Patrick Geddes, of Edinburgh,¹ was a conspicuous feature of the exposition held in that city during the same

¹This entire exhibition was unfortunately lost through the sinking by the German cruiser "Emden" of the ship in which it was being taken to India in the autumn of 1914.

year, although both the congress and the exhibition were devoted chiefly to the sociological aspects of the subject. An excellent exhibition was also held in New York at the close of 1913, the amount of material furnished for which far exceeded the space available for its display.

Notwithstanding all these meetings and discussions and the great amount that has been written and said, there seems to be more or less uncertainty as to just what city planning or town planning means. Some appear to consider it the designing of spectacular effects in the grouping of public buildings and the establishment of civic centers, the creation of imposing open spaces, the cutting through of broad avenues or the straightening and widening of existing streets, the reorganization and rearrangement of transit facilities and terminals, in short, the rebuilding or making over of cities and towns. These might more properly be called the correction of mistakes or the remedying of defects due to a lack of proper planning, rather than the more fundamental work of city planning which should have as its chief object the avoidance of the necessity of costly reconstruction. What, then, is city planning? Many definitions have been written, some long and some short, some emphasizing the architectural and artistic side and others laying chief stress upon its social aspects, but few of them appear to recognize it as an engineering problem.

Mr. George McAneny, who has rendered distinguished service as President of the Borough of Manhattan and President of the Board of Aldermen, of New York city, says: "City planning simply means getting ready for the future in city growth. It is the guidance into proper channels of a community's impulses towards a larger and broader life. On the face it has to do with things physical--the laying out of streets and parks and rapid-transit lines. But its real significance is far deeper; a proper city plan has a powerful influence for good upon the mental and moral development of the people. It is the firm base for the building of a healthy and happy community."

Mr. Charles Mulford Robinson says: "City planning is an effort to promote urban efficiency by the closest practicable adaptation to function in the city's every part. Such adaptation involves pleasantness of aspect because the city serves life and is a home as well as a workshop, and it involves physical and social fitness as well as commercial and industrial efficiency, partly because there could not be maximum economic efficiency without such aids and partly in recognition of the fact that life is more than money getting."

Mr. Arnold W. Brunner says: "The basic principle of city planning is to increase the working efficiency of the city. No far-seeing business man would undertake the construction of a large manufacturing plant without making provision for future expansion and other possible contingencies, but the building of a city, our most important and complicated enterprise, often proceeds in a haphazard fashion without preparation for change or growth. The result is the confusion and congestion with which we are all so familiar."

Mr. J. P. Hynes gives this definition: "City planning means the anticipation of the city's development and providing for it, legislatively, socially and financially, before the demands of an increasing population become prohibitive in cost. The reverse is exemplified in congestion of population and traffic, inadequate and belated public works and uneconomic financing in cities that lacked the foresight of city planning."

Mr. George B. Ford defines it as follows: "City planning is the name given to the science and art of providing for the most practical and agreeable development of a city or town. It would prevent the recurrence in newer districts of the mistakes of the older. It would profit by that which time has proved worth while in the experience of any city. It would determine the relative urgency of the various needs, and plan a consistent program of procedure covering every phase of the subject. It would concentrate on these matters in turn and get concrete results."

The definition frequently used by the author has one merit,

that of brevity. It is this: City planning is simply the exercise of such foresight as will promote the orderly and sightly development of a city and its environs along rational lines with due regard for health, amenity and convenience and for its commercial and industrial advancement.

While the inhabitants of any country are usually inclined to think their own institutions and customs far better than, and to be somewhat intolerant of, those of other countries, there appears to be a disposition to attribute peculiar merit to the planning of the cities in other lands. The English, for instance, greatly admire the wide streets and the effective grouping of buildings in German cities, while the Germans are charmed with the garden villages attached to some of the great manufacturing plants in England, although nowhere, perhaps, have more attractive homes been made for artisans, or have these homes been arranged in a more pleasing manner than in the several colonies established in connection with the Krupp works, at Essen. American writers on city planning have been extravagant in their praise of the planning and arrangement of Old-World cities and are constantly comparing them with their own towns to the great disadvantage of the latter. Such unfavorable comparisons are too frequently justified, and yet some admirable things in the way of planning have been and are being done in the cities of the United States. Can this tendency be attributable to a sort of national modesty, which prompts one country or the people of one country to admire and praise what has been done in another country? Probably not, as national modesty is a quality rarely, if ever, manifested. It seems to be due, rather, to an almost universal disposition to be attracted by and to admire effects with which one is unfamiliar, provided they do not too violently offend certain customs and standards which are so ingrained as to have become habits. When the tall buildings were first erected in American cities they were declared to be monstrosities, not only by visitors from abroad, but by most Americans. The architects, except those who were fortunate enough to secure

commissions to design one or more of them, were especially offended, as they were held to violate the most sacred architectural traditions. As the character of their design improved, and some really beautiful effects were produced, the American architects were still severely critical, and it was not until foreigners began to admit that many of these buildings were really beautiful that Americans began to realize that they had produced something which was admirable. (Pl. 1.) That the erection of buildings twenty, thirty and forty stories high, close together along streets of ordinary width has had a very serious effect upon traffic and other conditions and that they have injuriously affected each other as far as light and air are concerned (Pl. 2, p. 13) and that they have seriously impaired the land values is only too evident, and New York and other cities are now struggling with the problem of controlling the height, bulk and arrangement of buildings, as will be told in a later chapter. The tall buildings themselves, so far as their appearance is concerned, are not altogether condemned. One well-known architect has enumerated three points in their favor—their beauty in the aggregate is most impressive, they represent a distinctive type of national architecture, and they have become the artistic expression of a commercial necessity.

Professor Patrick Abercrombie, in the pages of the *Town Planning Review*, has made a number of interesting comments on the achievements and salient points of city planning in different countries, some of which will be briefly abstracted.¹

Sweden was, perhaps, the first country to enact a comprehensive town planning law, which appears to be based upon the assumption that a plan is requisite for every town. The results obtained through the application of this act may be subject to criticism in that the insistence upon wide streets has tended towards a monotonous gridiron type, which in some cases has been forced upon the old and irregular parts of the cities.

Germany has, perhaps, achieved more modern town planning than any other country, and yet, if judged by legislation, the

¹ *Town Planning Review*. Vol. IV., p. 98.



The sky line of lower Manhattan Island, New York. The views, beginning at the top, show conditions in 1876, 1893, 1904 and 1915. The smaller scale of the 1915 view fails to show the great increase in the mass of buildings during the last period (p. 12).

PLATE 2



Some examples of the way in which Manhattan Island, New York City, has been developed, making the widening of streets impossible on account of the great expense (p. 12).

German municipalities appear to possess very limited powers, but in Germany town planning is a tradition, and the desirability of it is never questioned. Conspicuous features of German planning are: Zoning, by which the erection of lofty tenements has been restricted; the practice of converting old fortifications into wide circumferential streets, as in Bremen and Cologne, but which has been conspicuously neglected in Berlin; the careful preservation of the ancient centers of the city as in Frankfort and Nuremburg; the acquisition of large tracts of land outside the city, which in Strassburg is said to be equivalent to a plot 57 feet square to each inhabitant, in Ulm to 80 per cent of the total area of the city and its immediate suburbs and in Berlin to three times the area of the city. The "Lex Adickes" gives the municipal authorities power to redistribute land which, as originally divided, may have been rendered practically useless by the adoption of a street system, the land remaining after providing for streets and open spaces being redistributed in useable portions. This law, which appears to meet a situation, the difficulty of which has long been recognized in other countries, was devised by and bears the name of a distinguished municipal officer of a German city.

Austria is essentially German in its treatment of town planning problems, but Vienna, the Austrian capital, is a city in its own class. Its Ringstrasse, located on ground formerly devoted to the inner fortifications, is one of the most notable streets in the world. A second ring street has been provided on the line of the outer fortifications, while there is again a ring of meadow and beyond that a ring of wooded hills.

France has paid more attention to the physical construction of its cities than to their organization, and has laid more stress upon the monumental and architectural aspects of the street plan than upon picturesque effects. No city has provided as well as Paris for direct exits from and approaches to the city, although several of her great boulevards were originally constructed as private drives for royalty. Perhaps the Avenue de

l'Opera is one of the most notable achievements of city planning by the construction of a new street furnishing an impressive vista. Traffic planning has claimed a large share of the attention of students of city planning in France.

England has been very backward in what is known as modern town planning, particularly in its monumental aspects. Scarcely a single great building has been provided with an adequate site and approach in modern times, while failure to provide for traffic needs has been most conspicuous, and yet it is the English individual home, which has been religiously protected for generations, which appears to be the moving spirit in most of the town planning of the last decade.

In Belgium the strong individuality of the different towns, Brussels, Antwerp, Ghent and Bruges is conspicuous. Recent plans for the improvement of Brussels, however, appear to have derived their inspiration from Paris.

Italy has not been behind its neighboring countries in city planning or in legislation directed to that end. The Italian cities possess powers of expropriation which have been found to be exceedingly valuable, and these powers have been exercised in a wise fashion, enabling the authorities to recoup a large proportion of the cost of new public works.

In the South American cities of Rio de Janeiro and Buenos Aires some ambitious projects have been carried out, particularly the cutting through of new streets and the creation of great boulevards along the water front which have made these cities among the most notable in the world.

In America three conspicuous features of town planning are emphasized: first, the devotion to the gridiron plan, which has been described as a "scientific nightmare in which squares are carried over the whole country irrespective of natural zones and contours and in comparison with which the lack of planning which formerly prevailed in England is admirable"; second, the great number of monumental projects which have lately been put forward, many of them most imposing and beautiful, while traffic improvements have been conspicuously successful;

third, the scientific provision for recreation which has lately been made in many American cities.

While it is interesting to note the characteristics of city planning in various countries, as interpreted by students of the subject, it must not be forgotten that the fundamental principles underlying the planning of all cities are practically the same, although the method of their expression may differ. Such method may be the result of habit or of local tradition rather than of painstaking investigation and it is frequently admired because it is somewhat different from that to which we are accustomed, but, as Mr. A. T. Edwards observes, "parochial art is invariably second rate." He further remarks that "while there is town planning in England, town planning in Germany, town planning in France, there is no such thing as English, German or French town planning any more than there are English, German or French sciences of arithmetic."

Perhaps it may fairly be said that the city planning which is now being done in America is chiefly confined to projects covering very restricted areas, the designs for which are usually made by a single man or a small group of men architects, landscape architects and occasionally engineers being associated together. The gradual development of a beautiful city, like some of the old towns of Europe, through the painstaking work of many individuals of successive generations, all of whom had an intense pride in their city, is practically unknown. The spirit which produced the old towns so frequently found on the Continent appears to be lost. A desire to do the work well, rather than quickly or cheaply, has given place to the ambition to do as little work as possible for the day's wage. The wage is standardized and is paid for so many hours of work without regard to quantity or quality. The idea of work for work's sake, the devotional feeling on the part of the workman who carved the pillar of a church or some detail not often noticed by the casual observer appears now to be regarded as a sentimental weakness. Will the old spirit ever return, and can the

fine old towns of Continental Europe again be produced without that spirit?

There is a deplorable lack of originality in many of the city planning schemes which are constantly being advocated. The designers are too prone to try to reproduce some public square or "grand place" which may arouse well-merited admiration in the town in which it is located, but which may be entirely incongruous in a modern American city. Most of the towns which are so greatly admired owe their peculiar attraction to some special quality which is closely related to their history and environment, to the nature of the scenery about them, to the customs of their people, to the type of their industries or even to the color of their building material. In the gray old English towns a bit of brilliant color appears incongruous. The "rose-red town of Inverness" has a peculiar charm due to the color of the stone so generally used in the construction of its buildings. Now that any town can draw upon the building materials of an entire country or even of foreign countries that consistent harmony of color no longer exists. An attempt to transplant a picturesque bit of Rothenburg to the plains of Long Island or to the prairies of the Mississippi valley would be absurd; a Venetian "piazza" in Pittsburgh or Omaha would be grotesque. "Don't copy Europe" is the advice given to American city planners by no less an authority than Dr. Werner Hegeman, of Berlin.

A rational city plan is inevitably of slow growth and, while there seems to be a passionate desire at the present time to correct at once such obvious defects as are to be found in the plans of most of the cities of Great Britain and the United States, and from which those of Continental Europe are by no means free, the task is too great for any one man or group of men, or even for any one generation, and there is danger that, recognizing the futility of the attempt, and staggered by the magnitude of the undertaking, interest will be lost and we will go on repeating our old mistakes. As Professor Eberstadt says: "Town planning rushed at too hurriedly or pursued inadvisedly may turn out to

be an instrument of greater danger than a mere leaving to chance the growth of our cities."

The city-planning movement, as it is now generally understood in America, may be said to date from 1893, when the "white city," created by the genius of the late Daniel H. Burnham and an able group of associates for the international exposition held that year in Chicago, made a profound impression upon all who saw it. It is safe to say that such effective grouping of a series of monumental buildings of harmonious design had never before been accomplished or even attempted and, while the buildings themselves were temporary, the effect which they produced has been permanent, and the influence of the general plan is quite evident in most of the ambitious projects for the creation of civic centers which have since been put forward. In every great exposition which has since been held this effective grouping of the buildings has been followed to a greater or less degree, and with the introduction of lagoons and canals and the wonderful improvements in the art of electric lighting, the results have been so beautiful that they have given a new impetus to what is commonly called city planning.

The British, who have developed great enthusiasm over town planning, appear to have acquired a more fundamental conception of what planning really means, in that they are devoting their attention chiefly to the territory not yet developed in an effort to avoid such blunders as have been made in the past, rather than trying to make their towns over, or, when that is found to be impossible, to create one or two beauty spots or show places and stop there. They are trying to save the unspoiled places rather than devoting their attention to costly schemes of reconstruction while fresh mistakes are being made elsewhere, the latter policy being the one too often followed in the United States. The town planning legislation of Great Britain, the underlying principles of these acts and what has been accomplished under them, are discussed at some length in other chapters.

There are many who believe that the chief purposes of city

planning are social, that problems of housing, the provision of recreation and amusement for the people, the control and even the ownership and operation of all public utilities, the establishment and conduct of public markets, the collection and disposal of wastes, the protection of public health, the building of hospitals, the care of paupers, criminals and the insane, and all of the other activities of the modern city are all a part of city planning. All of these, however, are matters of administration rather than of planning in the sense that it will be considered in this volume and, while some of them may be referred to in the succeeding chapters, the author's intent is to do so only as they are related to the more fundamental problems of so planning a city that the necessary buildings or the space required for them may be provided without the destruction of improvements already made or a recasting of the plan, so that good sanitation and decent housing and all that makes a city a better place to live in will be made easy rather than difficult. While the author is in hearty sympathy with all movements that will promote better living, a finer citizenship and greater culture and that will give every citizen an equal chance to enjoy the advantages which may be provided, the chief emphasis will be placed upon the initial work of planning which will make all of these easier of attainment.

There have been times when the opinion quite generally prevailed that the city was a necessary evil, that it was an unnatural and unwholesome thing for large numbers of people to be gathered together within the confines of a city. Mr. Walter E. Weyl, writing in *Harper's Magazine* for April, 1915, says that to "the fathers" the very conception of the city had in it something unwholesome. It was in their opinion "a dwelling place of turbulent, impious, impudent mobs, of a congregation of unproductive artizans, wastrals, criminals, Sabbath breakers. It was a blister on the social body; a tumor which absorbed the healthy juices. The city was vaguely associated with royalties, courts, armies, beggars, and tattered, insolent, rescally mobs; the country was the cradle of republican virtue and democratic

simplicity. Jefferson, having in mind the squalid agglomerations of the old countries, congratulated America on being rural." He further says: "For the most part the ancient city, whether great or small, lived parasitically on the country. It was the abode of exploiters, princes, landlords. Rome rendered nothing to Egypt for the corn which it took from Egypt. The modern city renders service commensurate with the service rendered to it. It fashions in its factories the products of the country and redistributes them to a wide nation, economically dependent."

Under modern social conditions with the subdivision of labor and a high degree of specialization, each individual doing one thing fairly well, if not expertly, and depending upon others for the things he does not do himself, urban living is a natural condition. Whether the very large cities will continue to increase as they have during the recent past may be doubted, and estimates of future population, based upon such increase, may be very misleading. That the percentage of urban population will continue to increase is probable, if not certain, but that the very large urban units will go on increasing at the sensational rate of the last few decades is unlikely. A certain degree of decentralization would probably be desirable, resulting in more towns of moderate size and proportionately few very large cities, even though some of the towns may be so near together as to make it economical and desirable to combine in the carrying out of certain enterprises which are metropolitan in their nature, such as water supply, main drainage, policing and the protection of public health.

In 1820 but one person in every twenty in the United States lived in cities of 8000 or over. In 1850 this proportion had increased to one in eight, in 1870 to one in five and in 1900 to very nearly one in three. The drift to the towns continues, as is shown by Table I, which is compiled from the United States census of 1910. It will be seen that the urban population is increasing at a rate more than three times that of the rural population and that in 1910 one in every two and two-tenths people were living in towns of 2500 and over. While the very

large cities have continued to increase at an astonishing rate it will be observed that the greatest rate of increase has been in the case of the cities of from 50,000 to 250,000 population.

TABLE I

SHOWING RATE OF INCREASE OF URBAN AND RURAL POPULATION IN THE UNITED STATES BETWEEN 1900 AND 1910

CLASS OF TOWNS. POPULATION.	NO OF TOWNS IN 1910	TOTAL POPULATION		PER CENT OF INCREASE 1900 TO 1910
		1910.	1900.	
1,000,000 or more	3	8,501,174	6,429,474	32 2
500,000 to 1,000,000 . . .	5	3,010,667	2,501,226	20 4
250,000 to 500,000	11	3,949,839	2,932,040	34. 7
100,000 to 250,000	31	4,840,458	3,421,849	41 5
50,000 to 100,000	59	4,178,915	2,948,511	41 7
25,000 to 50,000	120	4,062,763	3,028,007	34 2
10,000 to 25,000	374	5,609,208	4,153,442	35 0
5,000 to 10,000	629	4,364,703	3,194,278	36 6
2,500 to 5,000	1,173	4,105,656	3,000,818	36 8
Total urban population . . .	2,405	42,623,383	31,609,645	34 8
Rural population	49,348,883	44,384,930	11 2
Total population of U. S.	91,972,266	75,994,575	21 0

On July first, 1915, the census bureau estimated that of the 9,899,761 population of New York state, 54 per cent lived in the single city of New York and no less than 76 per cent lived in cities of 8000 or over, and the same conditions, though in somewhat less degree, exist in other eastern cities of the United States. Great increases in urban population have not been confined to North America. Buenos Aires, which now has a population of more than 1,500,000, and Rio de Janiero with nearly 1,000,000 have both been increasing at a considerably greater rate than have Chicago, Berlin or Vienna. The author has made a comparison of the relative rate of growth of six German and six American cities which had approximately the same population in 1880. The table giving the results has frequently been published, sometimes without reference to its source, but they are so remarkable that they will be repeated here.

TABLE II
SHOWING THE INCREASE IN POPULATION OF SIX GERMAN AND SIX AMERICAN
CITIES FROM 1880 TO 1910

CITIES.	POPULATION.				PERCENTAGE OF INCREASE		
	1880.	1890	1900.	1910	1880 TO 1890.	1880 TO 1900	1880 TO 1910
Cincinnati . .	255,139	296,309	325,902	364,463	16 1	27 7	42 8
Breslau . .	272,900	335,200	422,728	510,929	22 8	54 9	87 0
Buffalo..	155,000	255,664	352,387	423,715	65 0	127 1	173 4
Cologne . .	144,800	281,800	372,229	513,491	94 6	157 0	254 6
New Orleans.	216,000	242,039	287,104	339,075	12 0	32 8	56 9
Dresden...	220,800	276,500	395,394	546,822	25 2	79 0	147 1
Louisville. .	123,758	161,005	204,731	223,928	31 0	65 4	80 9
Hanover . .	122,800	163,600	235,666	302,384	33 2	91 0	146 2
Providence .	104,850	132,099	175,597	224,326	26 0	67 5	113 9
Nuremberg	99,519	142,523	261,022	332,539	43 2	162 3	234 1
Rochester.	89,366	133,896	162,608	218,149	49 8	82 0	144 1
Chemnitz.	85,000	138,955	206,584	286,455	63 5	143 0	237 1

The cities selected were believed to be typical and did not include any of the great capitals. They were selected some years ago to show the growth during the first of the three decades and the comparison has been continued to include the last decennial census. Inasmuch as the increase of population in the United States during the last census period was 21 per cent, while the increase in that of the German Empire was but 16 per cent, the movement of population from the country to the cities in the latter country appears to be much more conspicuous. The remarkable industrial development of Germany may be the chief reason for this, but it is a significant fact that the German cities in their thorough and far-sighted planning have been getting ready for such increases.

It is quite apparent that the need of proper city planning is not confined to the very large cities, but that it is equally

important in the case of the smaller cities and towns, while they also present greater opportunities. The small manufacturing town of today may be the great industrial city of tomorrow. What is now a small city may be the center of a metropolitan district during the next generation. In some cases such growth and development may be predicted with considerable confidence and planning on a large scale would be justified. In any case and whatever the plan may be such reasonable foresight can be exercised as will permit it to be adapted to the new conditions with as little disturbance and destruction of improvements as possible. The important thing is that the work of planning be entrusted to men of vision as well as technical training and experience. But this is not all that is necessary; a reasonable plan once decided upon should be adhered to in its essential features notwithstanding the opposition and the insistent demands for a departure from it which are likely to be encountered from those who are actuated by selfish interest or who are unable to look beyond their own limited horizon. Former President Taft, speaking of the plan of Washington, says:

“Washington’s appointment of l’Enfant, an educated French army engineer, to lay out the Capital City was a most lucky circumstance in our history. L’Enfant’s plan in a way resembles the Federal Constitution. That great instrument of government has proven itself adaptable to a change of conditions that even the most clear-sighted man of affairs could not have anticipated. The simple comprehensiveness of its broad lines under the statesmanlike interpretation of Marshall has proved equal to the greatest emergencies and the most radical crises that could possibly confront a nation. So Washington and l’Enfant and Jefferson in their planning for Washington have left a framework for its development that the ablest architects and artists, now more than a hundred years after the plan was drawn and its execution begun, have confessed themselves unable to improve. The plan has been departed from in two or more notable instances through the obstinacy of

men in power who could not appreciate its admirable qualities. Instead, however, of manifesting regret at these we should be grateful that they are so few in number, and that we are still able to carry out the plan and to make what its complete execution will make of Washington—the most beautiful city in the world. The reason why this is possible is because it has never been a center for business or manufacture, because its *raison d'être* is only to provide a seat for government activities and a home for public servants who carry them on. It is thus singularly free in its opportunity to devote its energies to enhancing its own stateliness and acquiring a dignity appropriate to the heart of our national sovereignty. . . . In its history Washington city has had to live through the day of small things. The plan of l'Enfant met the obstinacy and lack of artistic sense of certain legislators who closed the vista between the White House and the Capitol by insisting upon the erection of the Treasury across the line of Pennsylvania avenue. Then later on, when Congress seemed determined to minimize everything national, it retroceded to Virginia the part of the ten miles square on the south side of the Potomac River and furnished substantial proof of its contracted view of Washington's future."

What is the dominant idea behind the city-planning movement as we see it in the United States today? What are the ideals which the average city planner has in mind and what the models which he strives to emulate? Beauty has heretofore been his chief aim, as was clearly shown by the frequent use of the term "The City Beautiful," which was formerly so much in evidence but which happily is now more seldom heard. His ideals were obtained from brief visits to the show-places of foreign cities and his models were the imposing open spaces, the broad streets, the well-designed façades and the fine vistas so frequently found in them. Beautiful indeed they are; but behind these attractive façades and as the price paid for them and the wide streets on which they front most distressing living conditions are frequently found. Dr. Hegeman points out that

in remodeling some of the European cities, the charms of which appear to dazzle so many Americans, only beauty and elegance were sought and that "to the production of this metropolitan elegance the most refined thought was given, but this thought benefited mainly the central sections of these capitals (the parts near the castles) and the exterior façades of the tenement houses. Behind these good-looking façades miserable crowding, lack of house gardens and the choking of the next generation were permitted. This kind of city planning did not attempt to make comprehensive, preconceived plans, covering all branches of city growth, but touching only one or two aspects (mainly artistic), exaggerated their importance and did nearly as much harm as no planning at all." Seldom does the peripatetic student of European city planning look for anything except these particular beauty spots. He is familiar with the unsightly parts of his own home city, the memory of the bare ugliness of which is particularly unpleasant when he looks upon the most notable achievements of the builders of Old World cities. He forgets the newness of everything at home. He does not look forward to the day when the open and unimproved spaces between the scattered groups of modest dwellings will be completely improved. These modest dwellings, though commonplace in appearance and monotonous in design, house the families of men who are working for a daily wage in a degree of comfort unknown to those of the same class who live behind the pretentious fronts which line many of the streets of the city he is visiting. The contrast between the appearance of the more important business thoroughfares and the unpaved and somewhat ragged streets which are characteristic of the outlying parts of some American cities is a rather painful memory, but the comforts which are found in the dwellings more than compensate for their less impressive exteriors. The cheapness of wood in America, the rapidity with which frame buildings can be erected, and the tolerance of the use of combustible building material have resulted in the erection of a large number of wooden buildings in the suburban parts of

American cities which, with the stock plans so frequently used and the obtrusive ugliness of scroll-saw applications, resorted to in order to relieve the monotony of the design, have given them a cheap and temporary appearance which compares unfavorably with the more substantial look of the stone and brick dwellings so generally found in Great Britain and on the Continent. It is true that those who are responsible for the planning of American cities have been slow to realize the importance of an orderly arrangement of the fundamental ground plan or of the system of main streets which will facilitate easy movement between different parts of the city, and a heavy penalty must some day be paid for this oversight in costly street widenings and cutting through of new connections, but this has been characteristic of city planning the world over.

Another thing that must be borne in mind when considering the pleasing effects of the centers of the European capitals is that they were planned by princes to whose courts were attracted the greatest architects and artists of the time, and their services were at the command of their royal masters, who themselves were men of cultivated tastes and large ideas, and were ambitious to create a capital worthy of their own importance in the world. If they could also secure a Minister of Finance who had the genius to devise the means to wring from their subjects the money to carry out these plans, the thing was done. When the people themselves are called upon to decide whether they will furnish the funds to carry out such ambitious schemes they are likely to hesitate a long time. It is only as a result of a campaign of education which will convince them that a proposed improvement will bring them a direct return through increased business or in some other material way that they can be induced to undertake it. When once undertaken its execution must be entrusted to the duly authorized city officials, or a special commission must be created for the purpose. The former course is obviously the proper one, but the limited periods during which such officials hold office in American cities and the disposition of a new man or group of men to make changes,

which may be prompted in some cases by considerations of economy and in others by a desire to impress their own individuality upon the scheme, often induce and appear to justify resort to a special commission.

It does not follow that a plan once adopted should never be changed in any respect. We call these plans comprehensive and final. If really comprehensive they should be adaptable to changing conditions with little, if any, interference with the general scheme; but final in all details they never can be. Mr. Taft has noted the unfortunate results of some modifications of the l'Enfant plan for Washington, but the plan was so simple, yet so comprehensive, in its main features that it could not be spoiled, and no greater tribute to its excellence could be paid than the action of the Committee of Congress to which was referred the question of the improvement of the capital city in recommending that in most of the cases where the l'Enfant plan had been departed from it should be restored.

CHAPTER III

THE CORRECTION OF MISTAKES

IT is not unfair to say that a large part of city planning, too large a part in fact, consists of the correction of mistakes. This is not unnatural for the reason that it is the realization of the blunders that have been made through lack of foresight or appreciation of the unsuitability of a plan under changed conditions that has rendered the need of better planning obvious. When conditions due to these mistakes or misfits become intolerable by reason of public inconvenience through obstruction of free movement and actual financial loss from consequent delays, and when the ugliness which is inseparable from lack of orderliness is realized, the demand for a correction of the defects in the plan are insistent and the public is willing to pay the price, however great it may be. The most of what are called city planning projects are of this kind, and serious attempts to avoid the same mistakes in parts of the city where improvements have not gone so far as to forbid readjustment of the plan without great expense, or to profit by past experience in the development of plans for the portions not yet mapped, or to save the unspoiled places, appear to have been afterthoughts. Some stupendous plans for the improvement of conditions have been advanced and in some cases carried out. Perhaps the most spectacular of all was the construction of the great boulevard system of Paris under the direction of Baron Haussmann. Undertaken partly for reasons of military strategy, but also to beautify the city, the various projects were carried out within a relatively short time, considering their magnitude, and were financed by an imperial government

with far less delay and debate than would have been possible under a democratic government, where it would have been necessary to convince the people that they were essential and that they would be worth the enormous cost involved. Naples also has carried out some great improvements by the cutting of broad avenues through districts where narrow, tortuous streets did not provide sufficient light and air to make business profitable or living tolerable. Vienna made itself one of the world's most beautiful cities, not by correcting mistakes in planning or which were due to lack of planning, but by availing herself of an opportunity to use lands formerly devoted to defensive works which were useless under modern conditions.

Chicago, through the efforts of private citizens, has worked out a plan for rearranging and reconstructing a considerable part of the city, which, if carried out in its entirety, will require many years of time and scores of millions of dollars, and a beginning has already been made on some of the details of this plan. In the last named city a phenomenally rapid growth has brought about within a generation the conditions which it is desired to correct, the city being so intent upon its physical and material development that little thought was given to the manner of its growth and the embarrassments to which its faulty plan would lead. New York, or at least the Borough of Manhattan, continued until quite recently to grow in accordance with the plan prepared for it a century or more ago without a realization of the defects of that plan, and now some modifications, the need of which is quite apparent, are rendered prohibitively costly on account of the building damage which would result, although some radical changes have been and are being carried out.

Some of the conditions which it has become necessary to remedy have been of very slow growth, and the agitation which has finally resulted in their improvement has been continued for many years. Instead of referring to a number of such projects, one or two will be described in some detail. One of the most conspicuous is the Strand-to-Holborn Improve-

ment in London.¹ This traverses one of the oldest parts of the city, where in the course of centuries a series of narrow, crooked and unrelated streets and lanes had grown up. High Holborn, of fairly generous but very irregular width, bounded it on the north and the Strand, narrower and equally irregular in width and lines, lay to the south. Drury Lane made an attempt to connect the two thoroughfares, but seemed to give up the idea and was shunted off into the narrow Wych Street before reaching the Strand. Lincoln's Inn Fields lay in the easterly part of this district and about 300 ft south of High Holborn and was an open space which appears to have given the public authorities much concern for generations. Formerly a place for the execution of criminals and in some instances of political offenders, it had a bad name, although it was referred to as one of the most beautiful squares in London, and parts of it were bordered by "dwellings of noblemen and gentlemen of qualitie." In the early part of the seventeenth century plans were made for its improvement and ornamentation, but they were not carried out, apparently for the reason that funds for the purpose were not provided. Finally, in 1735, Parliament passed "an act to enable the present and future proprietors and inhabitants of the houses in Lincoln's Inn Fields in the County of Middlesex to make a rate on themselves for raising money sufficient to enclose, clean, and adorn the said fields." The conditions which it was desired to remedy are set forth in great detail in a preamble to the act which read in part as follows:

"And whereas the said great square now called Lincoln's Inn Fields, situate in the several parishes of Saint Giles in the Fields, Saint Clement Danes, and Saint Andrew Holbourn, in the County of Middlesex, hath for some years past laid waste and in great disorder, whereby the same has become a receptacle for rubbish, dirt, and nastiness of all sorts, brought

¹ The agitation leading up to this improvement and the conditions which it was designed to remedy are described in detail by Mr. Charles Gordon in "Old Time Aldwych, Kingsway and Neighbourhood," from which and from official reports of the construction and opening of the new thoroughfares the following information has been obtained.

The Planning of the Modern City

and laid not only by the inhabitants of the said field, but many others, which has not been removed or taken away by the several scavengers of the parishes wherein the said fields are situate as aforesaid; but, also, for want of proper fences to inclose the same, great mischiefs have happened to many of his Majesty's subjects going about their lawful occasions, several of whom have been killed, and others hurt and maimed by horses, which have been from time to time aired and rode in the said fields; and, by reason of the said fields being kept open, many wicked and disorderly persons have frequented and met together therein, using unlawful sports and games, and drawing in and enticing young persons into gambling, idleness, and other vicious courses; and vagabonds, common beggars, and other disorderly persons resort therein, where many robberies, assaults, outrages, and enormities have been, and continually are committed, notwithstanding the watch or guard allowed by the several parishes, wherein the said fields are situate, for preventing the same; and, whereas the south, west, and north parts of the said fields are encompassed with houses, many of which are inhabited by the owners and proprietors thereof, who, with the other inhabitants, cannot go to and from their respective habitations in the night season without danger, and therefore are desirous to prevent any mischiefs for the future, and to inclose, clean, repair, and beautify the said fields in a graceful manner, and are willing and desirous that an adequate contribution may for that purpose be raised by and amongst themselves; wherefore, and to the end that the said fields may be inclosed, cleansed, and adorned, and kept in repair for the future, the said proprietors and inhabitants do most humbly beseech your most excellent majesty that it may be enacted, etc."

Lincoln's Inn Fields was finally redeemed and became an attractive park of some six or seven acres in addition to its bounding streets, but it was so hidden away in a maze of narrow lanes that one not familiar with its location would be unlikely to discover it. Even today the visitor to London might pass along Kingsway within 50 yards or along High Holborn within a hundred yards of this little park without suspecting its existence unless his attention were directed to it by a guide-book. (Pl. 3, p. 42.) Its improvement was of little more than local benefit and the delays and inconvenience to traffic in its vicinity were in nowise abated, and the need of a direct connection between the Strand somewhere near the Church of St. Mary le Strand or the Church of St. Clement Danes and High

Holborn in the neighborhood of this open space was more obvious.

In 1836, and again in 1838, a plan was laid before the Select Committees on Metropolitan Improvements, showing a scheme for connecting Holborn with the northwest corner of Lincoln's Inn Fields by a street 50 ft. wide, for the utilization but not the widening of the street along the westerly side of the fields, and then passing from its southwesterly corner to the Strand by a new street 50 ft. wide following the line of Newcastle Street (*A* on plan).

It will be noted that this new and modern thoroughfare, which was admittedly much needed, was to be only 50 ft. in width. The improvement, together with a number of others at that time suggested, was postponed on account of the difficulty of meeting the expense and also because other improvements were considered even more important. Again, in 1847, the general scheme was submitted to a commission which had been appointed "to consider the most effectual means of improving the metropolis." The general plan was somewhat similar to that at first put forward, except that the new street from Lincoln's Inn Fields to the Strand was to take a southwesterly direction, entering the Strand near Wellington Street (*B* on plan), instead of Newcastle Street. Nothing, however, was accomplished at this time.

In 1855 the Metropolitan Board of Works was created, and this same plan, with many others, was brought to its attention, and from that time until 1889, when the Metropolitan Board of Works was superseded by the London County Council, the scheme was the subject of frequent consideration and discussion, but nothing was done. Until 1883 the Board had made no attempt to secure the sanction of Parliament for such an improvement in view of what were considered even more pressing needs for new thoroughfares in other parts of the city. In 1883, however, the Metropolitan Board of Works concluded to apply to Parliament for the necessary powers to not only construct this street, but also to widen the Strand

at Holywell Street. About the time this application was made the project had expanded somewhat, so that it was proposed to make the new street 60 ft. wide, commencing at Little Turnstile, Holborn, and proceeding to the westerly side of Lincoln's Inn Fields and then curving eastwardly and entering the Strand to the north of Saint Clement Danes Church. The government, however, did not grant the authority requested. In 1889, the newly constituted London County Council referred this same project to the Improvements Committee and to the Committee on the Housing of the Working Classes for the reason that it was believed that not only did the requirements of traffic demand this new means of communication between Holborn and the Strand, but that the building of such a street would cut through an area which would be greatly improved by its construction. This committee reported to the Council a plan for the construction of a new street from Holborn at Southampton Row (*C* on plan) in an almost direct line to Catherine Street at the Strand (*D* on plan), with a spur from the new street running from a point about 500 ft. north of the Strand to the latter street at Saint Clement Danes Church. Again it was resolved to postpone this or any other large improvements until some satisfactory provision could be made for an equitable distribution of the expense.

In 1892, a modified plan was brought before the Council which included the widening of the Strand and the construction of a broad avenue from Holborn at Little Queen street to the Church of Saint Mary le Strand with two streets diverging from the principal artery and reaching the Strand at points to the east and west of Saint Mary le Strand Church. It was this time proposed to make the new street 100 ft. wide with a circus some 200 ft. in diameter about midway between its termini. The Committee in submitting the plan recommended that provision should be made in the bill that the owners of the property benefited should contribute toward the cost. The Council adopted the recommendations, but owing to some dissatisfaction with the proposed distribution of expense the

bill did not receive the approval of Parliament. The estimate of the net cost of this improvement, after deducting recoupment by disposal of the surplus land, was about \$11,230,000. In 1895 and in 1896 the improvement was again brought before the London County Council, on the last occasion it being suggested that the original scheme of utilizing the western side of Lincoln's Inn Fields be again taken up. In 1896 the Council concluded that without waiting to carry out the entire scheme it was necessary without delay to proceed with the widening of the Strand. Parliamentary powers were obtained, and this improvement was at once proceeded with. One year later the Council decided to undertake another improvement which was intimately connected with that which had been under discussion for so many years, namely, the widening of Southampton Row north of Holborn, and this also was carried out.

These two improvements, namely, the widening of the Strand and of Southampton Row, made it quite apparent that the only logical plan for the new Strand-to-Holborn thoroughfare would be that which was suggested in 1892 or such a modification of it as would result in a direct connection with the widened Southampton Row. In 1898, after careful consideration of a variety of competing plans, it was decided that the scheme of 1892 providing a direct route from Holborn at Southampton Row to the Strand, modified, however, in accordance with some suggestions made by the Royal Institute of British Architects, and with some alterations proposed by the Committee, was the one to be carried out, together with a further widening of the Strand to the north of Saint Mary's Church. The plan also provided for the acquisition of the whole site within the area bounded by the Strand and the two branch streets, as well as a considerable area of land which would front on the new streets. There was some difference of opinion as to whether these new streets should be made 90 or 100 ft. wide. It was found that exactly the same properties would have to be acquired for the 90 as for the 100-ft. street, and while there would result from the wider street a smaller amount of surplus land,

it was believed that the increased width of the street would enhance the value of this land to an amount greater than the value of the 10-ft. strip to be added to the thoroughfare. This plan having been decided upon, it was submitted to Parliament, and was the largest scheme of town improvement ever undertaken in London. The plan was opposed by forty or more powerful and influential companies and persons on various grounds, including the following:

1. That the Council should not be authorized to take property not actually required for the new street but needed with a view to recoupment, but that it should be limited in the taking of property to that actually required for the improvement,
2. That if the Council were given this power it should not have the power to impose a special assessment,
3. That the owners of property to be taken were entitled to insist upon reinstatement upon some other convenient site.

The bill ultimately passed and became a law in 1899. In its final form the total estimate of the gross cost of the completed scheme was about \$30,600,000, while it was estimated that about \$21,800,000 would be realized from the sale of surplus land. The new street was constructed and formally opened on October 18, 1905, and it is interesting to note that the gross cost of property taken was just about \$1,000,000 less than had been estimated. The extent of the recoupment through the sale of the surplus land is indicated in another chapter.

London's experience in securing this great improvement has been recited at considerable length for the purpose of showing for how long periods many defective street plans have existed, how the defects became emphasized as the city grew, and what long and persistent effort and agitation are required before their correction is undertaken. Those who have struggled to bring about some similar improvements in their own city and have become discouraged at the repeated failure of their efforts may take heart when they realize that the Strand-to-Holborn Improvement was first advocated no less than sixty-nine years before it was physically completed. There may be

scant satisfaction in the thought that those of a succeeding generation will see the fruition of one's efforts, but we have learned something about the way to get results even under a democratic form of government, and plans for betterment which are really worth while and are intelligently and persistently advocated are not unlikely to be realized with fair promptness when their importance is generally appreciated. The people of a city which is self-governed seem to have a strong desire to talk over and debate any question relating to a municipal improvement, and this disposition is especially marked in the cities of Great Britain. The need of the improvement may be generally recognized, but the manner in which it is to be carried out must be thoroughly discussed, not by experts, but by the people themselves before they are ready to undertake it. When an unexpected opportunity to correct a defective condition at a minimum of expense is presented it is rarely availed of owing to this passion for full and free discussion. Mr. W. E. Riley, Architect of the London County Council, in a paper presented at the London Town Planning Conference of 1910, notes that in the great fire of London, in 1666, an area of 436 acres was burned over, and, although Wren and Evelyn promptly put forward their plans for the rebuilding of these areas (Figs. 14 and 15, p. 92) "select committees and royal commissions have met and reported with frequency and perseverance during the last century," thus illustrating the unwillingness of the people to act upon the suggestions even of one who had done so much to make London notable as had Sir Christopher Wren, without ample opportunity for full and free discussion, which was so protracted that the city had meanwhile adjusted itself to the conditions brought about by the fire and the old defects in the plan were perpetuated in the rebuilding.

Difficult and costly as has been the correction of the defects in the plans of European towns, it is vastly more so in cities like New York or Chicago, where, as the result of a lack of reasonable restrictions governing the height and arrangement of buildings, great and costly structures have been erected on

narrow streets to such an extent that street widenings or the cutting through of new streets would involve so great an expense that they are out of the question. Perhaps the fundamental mistake was the failure to impose limitations of height and bulk which would in the first place have prevented the overtaxing of the streets and yet would have diminished the cost of widening them should it become necessary. When a structure like the new Equitable Building in New York, which occupies a block approximately 160×308 ft. in size, one of the four bounding streets of which has a width of 75 ft., another 45 ft. and the other two 35 ft., can be built to a height of 38 stories, or 536 ft., at a cost of \$20,000,000 for the building and land, converting each of the adjacent streets into a narrow canyon where direct sunlight is almost unknown, it is quite apparent that New York made one of its most serious mistakes when it failed to restrict the height to which such buildings could be carried and thereby made it possible to prevent a modification of the street lines after the erection of such buildings. Efforts to bring about improvements in existing conditions or to correct mistakes frequently fail for the reason that they are too ambitious or attempt to do too much at the same time. Official commissions and unofficial committees have been appointed, and have made many plans for the correction of all the defects they could discover, but by reason of their failure to concentrate their efforts on one or two details of unquestionable importance, their labors have come to naught. Such a commission was created in New York city in 1904, and three years later presented a report, accompanied by a great number of plans involving radical changes. Some of them were admirable, particularly a few which related to the provision of a system of parks and parkways for a part of the city which was still undeveloped and for which there was no adopted street plan. Attention and interest were diverted from these, however, by a number of more spectacular projects for the cutting through of new and the widening of existing streets and the creation of plazas, the cost of acquiring the land for which, with the damage to existing

buildings, but with no allowance for construction, was estimated to be nearly one hundred millions of dollars. One or two of the projects have been or are in process of being carried out, but the agitation for them began before this commission was created and was persistently kept up until actual results were obtained. One of these was the southerly extension of Seventh avenue and the widening of Varick street. (Fig. 1.) Old Greenwich Village had an irregular street plan with no continuous and adequate north-and-south artery of traffic. The plan adopted in 1811 with its series of broad north-and-south avenues adjoined Greenwich on the north. The new Pennsylvania Station was located on Seventh avenue between Thirty-first and Thirty-third streets, while the building of the new Chelsea Docks along the Hudson River just west of the northerly part of Greenwich resulted in an increase of street traffic which had no adequate outlet to the south. A new four-track, rapid-transit subway was planned for the west side of lower Manhattan, but there was no available street which would afford a direct route for this transit line. A southerly extension of Seventh avenue, together with a widening of Varick street to West Broadway, appeared to offer a solution of the difficulty. After considerable discussion, which seemed brief in comparison with that devoted to the Strand-to-Holborn Improvement, the street was laid out, title acquired, the four-track rapid-transit railway is being constructed in it, and as soon as that is finished it will be suitably paved and this part of the city will have a thoroughfare which was essential to relieve it from the stagnation which was apparent through the inadequacy of its former street system.

Perhaps the most ambitious scheme for correcting the defects in the plan of a great city is that prepared by Mr. Burnham for the reconstruction of a large part of the central portion of Chicago and advocated by the Commercial Club of that city. It has been so often and so fully described, illustrated and discussed that it is scarcely necessary to refer to it at length. It includes not only the widening of many of the existing streets,

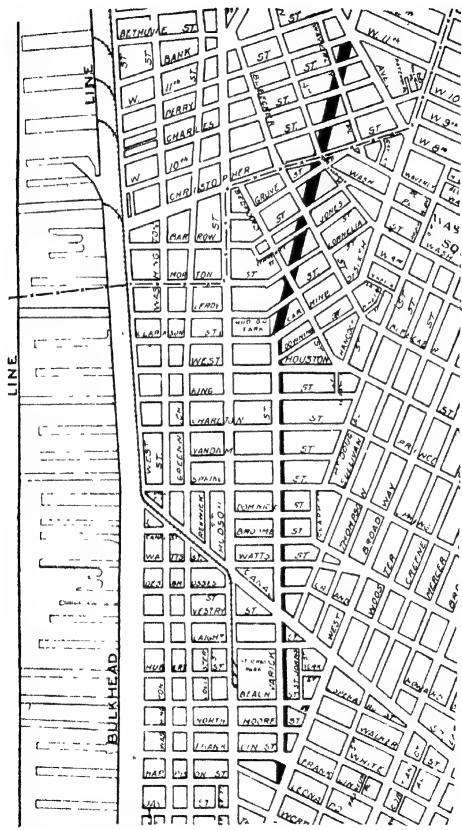


FIG. 1.—Showing the cutting through of a new street and the widening of an existing street to form a traffic artery 100 ft. wide in New York.

but the creation of a great number of diagonals which would cut through many blocks of intensively developed property. Perhaps its most spectacular feature is the great boulevard which sweeps on a circular curve through or about the district to be rearranged with an imposing civic center midway or at the point of the curve farthest from the lake front. The plan also includes an ambitious scheme for the development of the lake front by the improvement of existing and the creation of new parks, although this city possesses an unusually complete park system. Grant Park at the easterly end of the great axis leading to the civic center is to be extended into the lake, and will include a large lagoon or harbor for pleasure craft, while fronting it will be several monumental buildings. This part of the improvement and some of the other details in the vicinity have already been undertaken. The entire project of reconstruction, if carried out as planned, will require many years and will involve the expenditure of scores of millions of dollars. Its serious consideration and the actual commencement of the work offer evidence of a courageous optimism and faith in the future of their city on the part of the people of Chicago and a devotion to the public interest on the part of the aggressive organization which has put forward the plans which may bring about their realization, stupendous as they are.

Other changes might be cited, such as the removal of "the hump" in Pittsburgh, where the street grades over an area of $18\frac{1}{2}$ acres in the heart of the office district were lowered varying amounts up to a little over 16 ft., buildings of over 20 stories being underpinned and carried down to the new grades and their façades being remodeled to conform with the new conditions. The extent of this improvement is shown by Pl. 5 (p. 58). The rate of grade of the principal thoroughfare traversing the district was reduced from 7.6 per cent to 4.87 per cent, and at one point this street was lowered nearly 15 ft. The value of the property affected was over \$56,000,000, and waivers of damages were secured on property representing more than 77 per cent of this valuation. The cost of the improvement is estimated to be

\$3,141,000, of which about \$763,000 is for the physical work of changing the street grades with the readjustment of sewers and watermains, the remainder of the sum being for damages, against which there were offset assessments for benefit amounting to about \$909,000. These figures do not include the expense imposed upon the public service corporations in the removal and reconstruction of their surface and subsurface structures, nor that incurred by property owners who waived damages and reconstructed and adjusted their buildings at their own expense.

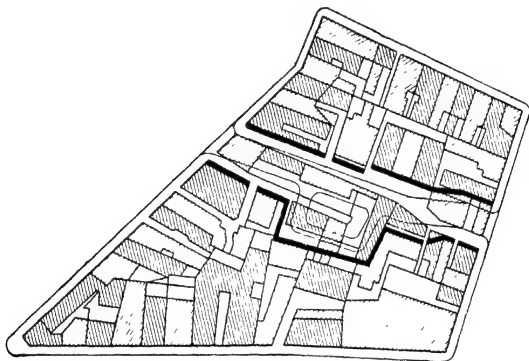


FIG. 2. Showing an over-buil block in Boston and the remedy proposed by the Boston Planning Board. Reproduced from the second annual report of the Mass. Homestead Commission.

Such corrections are not often on so vast a scale. Many have been carried out and many more have been proposed which, while covering a limited area and involving comparatively little expense, have redeemed the neighborhood by the removal of a blight which has grown up as the result of an inadequate street system, but which could not survive when the sunlight was let in. An example of this is shown by Fig. 2, which is taken from a report of the Massachusetts Homestead Commission.¹ Two

¹ Second Annual Report of the Massachusetts Homestead Commission, 1914, page 19.

small blocks, both of which are grossly overbuilt, are separated by an irregular narrow lane. The smaller of the blocks contains a population of 905 to the acre and 17 places of business; the larger a population of 822 to the acre, with 32 business places. The alternative plan suggested by the commission shows how these conditions could be improved by widening the lane and creating a small open space about midway of its length. The

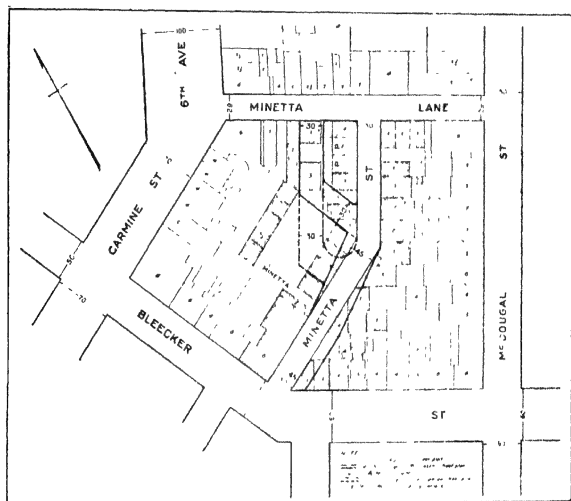


FIG. 3.—Showing a bad local condition in New York, and alternative methods which have been proposed for its correction

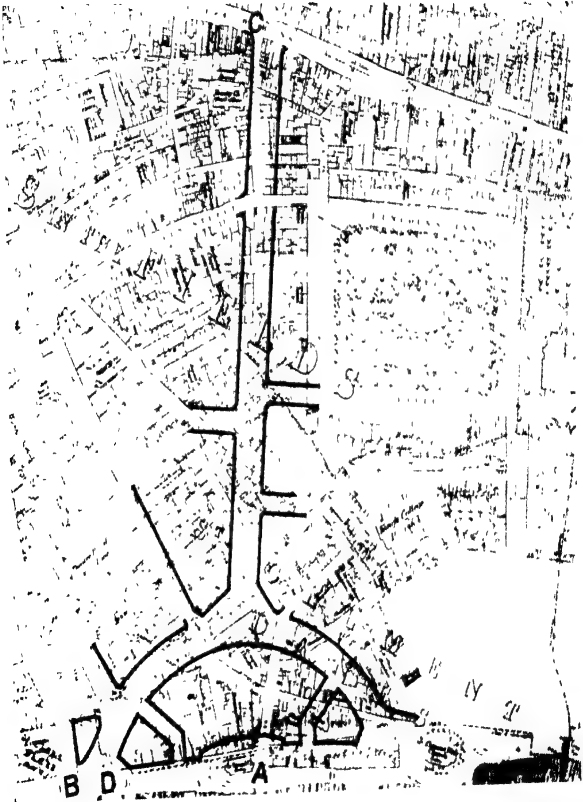
report states that the Boston planning board has estimated that by levying reasonable betterment assessments on the property benefited the proposed improvements could be made at a net cost of \$7500. A somewhat similar instance is that shown by Fig. 3, which is taken from New York city, and which is known as the Minetta street and Minetta lane problem. This small district, a stone's throw from important and busy streets, has been growing more and more shabby until it has

become a menace to the neighborhood. The plan shows one of the suggestions which have been made for its betterment. It is proposed to widen only one of the streets, but the introduction of a small open space at its junction with the other would doubtless have a most beneficial effect upon both.

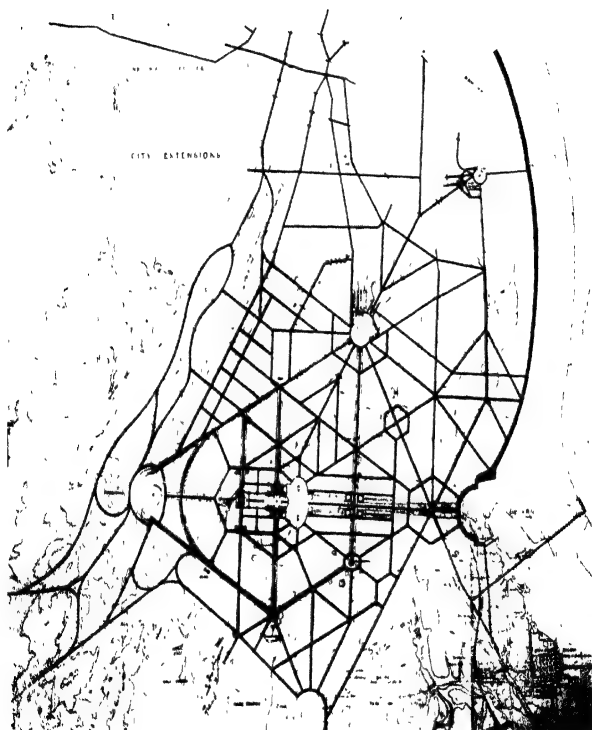
The over-development of the land between wide and attractive streets where the block dimensions are such as to permit the erection of interior dwellings is shown by one of the illustrations on Pl. 16 (p. 110), which is a small section of Charlottenburg. The restrictive ordinances enacted by German cities do not appear to have prevented the development of conditions such as these, which are frequently found immediately back of the imposing buildings which line the streets so much admired by casual visitors. It is true that liberal provision has been made for the recreation and amusement of the people of these cities, but their lives might be more wholesome and comfortable if they were given more light and air in their homes, even at the cost of some curtailment of their free entertainment.

Many more instances might be given, and, while less spectacular and attracting less attention than the creation of civic centers or new boulevards, they are fully as important and will as vitally affect the districts in which they are located. They are called city or town planning and no exception can well be taken to their description as such, yet it must be admitted that the necessity for them is due to a lack of far-sighted planning in the beginning and that they are really the correction of mistakes.

There may be occasional instances where not only the use to which the land in a particular neighborhood is devoted may so change as to require a recasting of its plan, but an entire city may undergo a radical change in character. This is what happened when it was decided that the city of Delhi, which in 1911 had a population of 232,837, should become the Imperial Capital of India. A commission was appointed to recommend a site for the new city. Here was a case where a very old city had to be adapted to new conditions or a new city had to be created which should be a part of or merged with the old



The Strand to Holborn improvement, London, finally carried out nearly seventy years after it was first proposed. Reproduced from "Old Time Aldwych, Kingsway, and Neighbourhood" (p. 30).



General features of the plan for the new Indian Capital at Delhi. Reproduced from the final report of the Delhi Town Planning Committee, copy of which was kindly furnished by Mr John A Brodie, member of the committee (p. 43).

town. The latter course was followed, and the manner in which the problem was solved and the general features of the plan which was recommended by the commission are shown by Pl. 4, which is taken from the final report of the Delhi Town Planning Committee made in March, 1913, which report, with the two which preceded it, furnish an interesting record of the problem presented, the manner in which it was attacked, and the various considerations which determined the final choice.

CHAPTER IV

ELEMENTS OF A CITY PLAN

WHAT is this thing that we speak of as a city plan? The idea most commonly conveyed by the term is a map showing the boundaries of the city and the street system which already exists and such streets as have been laid out for future development. It is primarily a map, the basis of which is a survey. The charter of the City of New York describes the city plan as a permanent map "showing the parks, streets, bridges and tunnels, and approaches to bridges and tunnels as heretofore laid out, adopted and established pursuant to law, and the maps and profiles included in or accompanying the same showing the grades of such streets duly fixed, adopted and established." The preparation of such a plan is little more than surveying, more or less precise surveying, it may be, but it may involve little study of the needs of the community, little sympathy with the traditions and ideals of its people, little exercise of imagination as to its future development and requirements. A plan of and for a city is not simply a map showing the streets, parks, bridges and tunnels and their approaches "as heretofore laid out, adopted and established pursuant to law." That is chiefly a record of what has already been done and cannot be changed without great expense; a record of the mistakes which have been made through lack of foresight and imagination. Not that such mistakes were necessarily due to stupidity, for a generation ago no one could have foreseen the marvelous development of our cities or the great social and economic changes brought about by recent inventions which have so greatly facilitated transit and other means of communication. The city plan as above defined is too minute as to details

and ignores the city as a whole, not only as it is, but as it will be. A real plan is rather the general system of arterial streets and transportation lines by which the different sections of the existing and the future city will be connected with each other and with centers of population outside of the city limits; parks and open spaces and other resorts for recreation and amusement; the existing water-front development and the space needed for its further increase; existing public and semi-public buildings and sites for those which may be required in the future. This is the real city plan which will control future development, stimulating it or retarding it as the case may be. The block dimensions and angles, the widths of minor streets and the subdivision into a vast number of rectangular blocks of standard size, with an explanation of or an apology for every departure from that standard do not constitute the city plan, the charter of the city of New York to the contrary notwithstanding. The city plan is something bigger and broader. It is something to which the city may grow, not something to which it must be restricted or within which it must be confined as in a straitjacket.

The economic considerations which should control city planning are precisely those which should prevail in the design of a house, shop, railway terminal or water-supply system; namely, adaptation to probable or possible increase in demand and capacity to supply that demand. If the manufactory or the railway is foreordained to failure, the less expended upon it the better. There are a few towns which were laid out during "boom" periods on lines which were fancied to be those of a future metropolis, where the broad streets are grass-grown, where the public buildings are but half occupied and where everything speaks of a splendid ambition which resulted in grotesque failure. When a city, occupying a strategic position, has begun a natural development which causes growing pains indicative of a misfit in its general plan, it is time to look toward the future, to adjust the plan to new conditions and to provide for still further growth. To tear down and enlarge is very

costly, especially so when there is no room for enlargement without the purchase of additional land which has become far more valuable than when the original enterprise was begun. This is constantly being done by individuals and corporations whose domestic or business requirements make it necessary. In any case it involves a distinct loss which may be justified by the means of indulging in a luxury or by the prospect of increased profit. Cannot the city, it may be asked, instead of trying to provide for the remote future, well afford the expense of reconstruction to adapt itself to its growing needs, especially when it has the power, through its ability to levy taxes and assessments, to impose a part or all of the cost of the necessary changes upon the property which will be chiefly benefited? No expense involving the destruction of property can be justified if it can be avoided by the exercise of reasonable forethought, and the taxing power of the city should not be used unnecessarily. The requirements of the modern city are so great that the burden of taxation will inevitably be heavy. Improvements in the city plan may increase values to such a degree that they would be cheap at almost any price, but if the plan had been so made as to avoid the need of costly changes, both the city at large and the individual property owner would have been the gainers. To defer the correction of mistakes which are quite apparent in well-developed sections of the city or to put off the adoption of a broader policy for those in process of development because land is expensive and costly improvements would be destroyed is not unnatural, even though unwise. To fail to take advantage of such object lessons in parts of the city where there are few, if any, improvements or where the street plan has not yet been definitely fixed is the height of folly.

Few writers on city planning have defined the elements of a comprehensive city plan. Some of those doing so have laid special emphasis upon the organization and administration of the city, particularly its social activities, and their list is a long one. Others have defined the several districts or quarters of a city which require special treatment, and their list is shorter.

An American architect has given twelve heads under which significant facts should be collected and classified in a study of city planning, namely: streets; transportation of people; transportation of goods; factories and warehouses; food supply and markets; water supply and sanitation; housing; recreation; parks, boulevards and tree planting; architecture; laws and financing. A French writer gives four divisions of the city which require special study and treatment: the business, the industrial, the administrative, and the residential quarters.¹ He also notes that "the climatic conditions of each country must necessarily determine the type of dwellings selected by the inhabitants." In 1874 the United Society of German Architects and Engineers laid down the fundamental principles of city planning as follows:

The basic principles of enlarging a city, considered from the technical, the economical and the administrative points of view are:

(1) The scope of city planning consists principally in fixing the base lines of all traffic movements and transit facilities, viz.: streets, street cars, railroads and canals, which must be treated liberally and systematically.

(2) The street net should contain the main streets, with the existing streets taken duly into consideration; the auxiliary streets which are fixed by local conditions, and in addition, other subordinate streets, treated in accordance with the necessities of the immediate future, or having their development placed in the hands of interested property owners.

(3) The grouping of the parts of the city should be effected in accordance with their location and individual characteristics, subject to such modifications as may be demanded by sanitary considerations and the exigencies of commerce and industry.

(4) The duty of the building department is to determine the rights and privileges of tenant and neighbor and house owner. Such rights and privileges are related to fire protection, freedom from interference, health, and safety of buildings, and all æsthetic considerations must be secondary thereto.

(5) It is desirable that expropriation and impropiation be facilitated by legal measures, and of still more importance is the creation of a law

¹ Mr. A. Augustin Rey in a paper on "The Growth and Development of Towns," presented at the London Town Planning Conference, 1910.

providing for the regulation of the contour of new or reconstructed blocks to be built upon.

(6) The city should be reimbursed by property holders directly benefited by improvements for funds advanced by the city for such purposes, and it is advisable to have the amount stipulated before the work is begun and a normal cost per front foot fixed.

(7) The activities of interested property owners' associations, in regard to the improvement of certain sections, should be subject to municipal supervision.

(8) Land upon which it is imperative to make improvements should only be built upon under reservations for its subsequent use by the city.

City planning is often held to include many things besides the physical city and to embrace the various functions, the efficient performance of which will depend to a large degree upon the skill and foresight with which the groundwork for the physical plan is laid. As this volume will deal for the most part with the engineering aspects of the problem, consideration will be given chiefly to the physical city. Without regard, therefore, to the various municipal activities and administrative details, the convenience and attractiveness of a city will depend chiefly upon four features of its plan:

1. The transportation system or the means provided for getting in and out of the city, and for quick movement of passengers and freight from one part of the town to another. It is obvious that transit needs cannot be accurately foreseen, but provision should be made for improving and extending them when needed. A large part of the transportation will always be in the streets themselves, and its adequacy and efficiency will be largely determined by the location and dimensions of the streets in which the intra-urban transit lines are located.

2. The street system in and through which the daily business is done and by which the people gain access to their homes and pass from these homes to their work, recreation and amusement. A street system once adopted and developed must remain indefinitely. While some streets may be widened and an occasional new street may be cut through existing improvements, the general street plan, once established and constructed,

is fastened upon the city as long as the city itself lasts. A catastrophe such as the great fire of London, in 1666, or the San Francisco fire, in 1906, may afford an opportunity for a recasting of the plan for a considerable area, but it is seldom availed of.

3. The park and recreation facilities upon which the comfort and health of the community are to a large degree dependent. It is true that a lack of proper parks may be supplied at any time, even when the space to be devoted to that purpose shall have been built upon and when the cost of their acquisition will be greatly enhanced, but a park system can be most economically and satisfactorily established in advance of other improvements and facility of access to them and proper connections between the different park units will depend upon the street system, so that it is desirable that the park plan be worked out in connection with the street plan.

4. The location of public buildings, which may render the conduct of public business convenient or difficult and may give a favorable or unfavorable impression to visitors. Public buildings like business buildings can be changed in location as necessity and convenience may require, but the suitability of their sites, whether they are convenient and commanding or awkward and unprepossessing, will depend upon the streets about them and leading to them, so that the location of these buildings should receive the most careful study in the preparation of the general plan of the city.

While there may be other elements which go to make up the complex organism called the modern city, those enumerated are the ones which are likely to give the town its character, to make it convenient or inconvenient, dignified or commonplace. Upon the skill and foresight exercised in providing for them will depend to a large degree the orderliness of the city's growth, and the facility with which individual and corporate activities can be carried on. These four features of a city plan will be discussed in some detail in the four succeeding chapters.

But city planning, even in the relatively restricted sense

in which the term is here used, includes the adoption of means to insure an intelligent program for the progressive development and the most profitable use of the transportation system, the street system, the park system and sites for public buildings for the benefit of all of the people of the city. It includes also plans for the sane financing of these improvements in order that the burden of cost shall be distributed as equitably as possible, that the few are not enriched at the expense of the many, and that the city's credit shall not be recklessly used. It includes a study of the traffic problems of the town, not only provision for traffic in the working out of the street plan, but its regulation in order that the existing street facilities may be used to their fullest capacity, avoiding in many cases costly changes which may be deemed necessary to accommodate unregulated traffic, when by the introduction of better system and control the desired results can be secured by ordinance instead of by bond issues or assessments. It may be said that this is a matter of administration rather than of planning, but if the city planner can point out how conditions can be improved by so simple and inexpensive a method as regulation instead of a replanning to meet changed conditions, it is surely within his province and it is his duty to do so.

The framework of a city may be intelligently planned and yet the objects sought may fail of realization owing to the lack of such control over the development of private property as will insure health, amenity and convenience. Healthy living may be rendered impossible by over-intensive development, failure to provide sufficient light and air through the absence of adequate courts and back yards, and the lack of restrictions as to the height to which buildings may be erected. Amenity, or pleasantness of surroundings, requires good design of the streets and their details - not the introduction of fountains and statues and other highly decorative features, but good proportion and the obvious adaptability of means to ends, the repression of garish and obtrusive signs and hideous noises. The convenience and comfort of those using the streets are

prudent, even though they may be progressive, policies before they will be given that degree of self-government, the need of which is so obvious at the present time.

All of these phases of city planning will be discussed in the succeeding chapters. Many of them have already been treated at length by those especially qualified to do so, and to some of them an entire volume could be devoted. An attempt will be made to show by a few concrete examples what has already been accomplished, rather than to indicate just how the several problems should be attacked or solved. No one can hope to master all of them, but all should command the sympathetic interest of the man or group of men who may be responsible for planning for the further growth or development of a city or town. They must not only be thoroughly familiar with the technical subjects involved, but should also have some knowledge of the legal and economic questions which will arise and how they have been solved in other cities, while social and humanitarian considerations should be given proper weight. The planners and builders of our modern cities are confronted with problems which are not only highly technical, but which are unsurpassed in their intensely human interest.

Certain parts of the city will be peculiarly adapted to specific uses, depending upon the topography, accessibility to transportation lines and other considerations. There will be business districts, industrial districts, high-class residential districts, and those where workmen can find cheap homes or low rents convenient to the places where they are to be employed. Special developments on the lines of the so-called garden cities, either for the accommodation of those employed in the business districts or in connection with industrial plants, will be undertaken if there are places available for them and, in order that this may be possible without going miles beyond the city's limits, considerable areas can well be left undivided in order that such developers may have a rather free hand in carrying out such plans, provided always that there is a competent authority with full power to control the general plan and whose approval should be required before it can be carried out. American cities generally have little power of initiative. Legislative action is commonly required to permit them to do constructive work themselves or to enable them properly to control improvements undertaken by private individuals or corporations. Laws permitting them to do, to allow others to do, or to forbid others from doing, seem therefore to be necessary, and the framing of wise laws to this end is an important part of a city planning program. European cities are often large landowners and frequently indulge in land speculation, from the profits of which many of their social activities are financed. The adoption of and consistent adherence to a wise and prudent land policy is therefore necessary. Frequent changes of administration and reversal of policies have made state legislative bodies reluctant to give much power of self-government to American cities and public opinion appears to incline to this view. Intelligent city planning and the orderly execution of a plan depend to so large a degree upon municipal prudence and self-restraint and upon continuity of policy and purpose that municipal officers will have to show that they are capable of exercising such restraint and of working out and adhering to wise and

prudent, even though they may be progressive, policies before they will be given that degree of self-government, the need of which is so obvious at the present time.

All of these phases of city planning will be discussed in the succeeding chapters. Many of them have already been treated at length by those especially qualified to do so, and to some of them an entire volume could be devoted. An attempt will be made to show by a few concrete examples what has already been accomplished, rather than to indicate just how the several problems should be attacked or solved. No one can hope to master all of them, but all should command the sympathetic interest of the man or group of men who may be responsible for planning for the further growth or development of a city or town. They must not only be thoroughly familiar with the technical subjects involved, but should also have some knowledge of the legal and economic questions which will arise and how they have been solved in other cities, while social and humanitarian considerations should be given proper weight. The planners and builders of our modern cities are confronted with problems which are not only highly technical, but which are unsurpassed in their intensely human interest.

Certain parts of the city will be peculiarly adapted to specific uses, depending upon the topography, accessibility to transportation lines and other considerations. There will be business districts, industrial districts, high-class residential districts, and those where workmen can find cheap homes or low rents convenient to the places where they are to be employed. Special developments on the lines of the so-called garden cities, either for the accommodation of those employed in the business districts or in connection with industrial plants, will be undertaken if there are places available for them and, in order that this may be possible without going miles beyond the city's limits, considerable areas can well be left undivided in order that such developers may have a rather free hand in carrying out such plans, provided always that there is a competent authority with full power to control the general plan and whose approval should be required before it can be carried out. American cities generally have little power of initiative. Legislative action is commonly required to permit them to do constructive work themselves or to enable them properly to control improvements undertaken by private individuals or corporations. Laws permitting them to do, to allow others to do, or to forbid others from doing, seem therefore to be necessary, and the framing of wise laws to this end is an important part of a city planning program. European cities are often large landowners and frequently indulge in land speculation, from the profits of which many of their social activities are financed. The adoption of and consistent adherence to a wise and prudent land policy is therefore necessary. Frequent changes of administration and reversal of policies have made state legislative bodies reluctant to give much power of self-government to American cities and public opinion appears to incline to this view. Intelligent city planning and the orderly execution of a plan depend to so large a degree upon municipal prudence and self-restraint and upon continuity of policy and purpose that municipal officers will have to show that they are capable of exercising such restraint and of working out and adhering to wise and

sacrificed if private owners are permitted to encumber the sidewalks by projecting portions of buildings or by temporary occupation for the display of goods, while street capacity, which might be ample if the abutting buildings were of moderate height, may be seriously congested if buildings are allowed to be carried to any height which the owners may find profitable.

Careful study may be given to and skill shown in the orderly planning of portions of a city or even of the entire area within the city limits, and yet, when the boundary line between the city and the adjacent towns is passed, the roads may be of inadequate capacity or without proper articulation; the approaches to the city may be shabby and uninteresting and the only available roads leading to the neighboring towns may be tortuous in their course and may pass through the meanest parts of both, giving the traveler a very unfavorable impression. The environs of the city should, therefore, be studied in connection with and in relation to the plan of the city itself. While the original ground plan has chiefly to do with the street system, the provision of suitable sites for public and semi-public buildings should be kept in mind. While the precise location of such buildings cannot be designated far in advance, the general plan should be such that a special site need not be created for each building as the time comes for its erection, streets being widened and new streets cut through in order to provide access to it or to enable it to be seen to advantage. If, for the sake of public convenience and in order to secure a good architectural effect, the important public buildings can be so grouped as to create a civic center, it should not be necessary to recast the street plan in order to do so. Not only for the buildings which are erected by the city and used for its public business should suitable sites be provided, but those of a semi-public character, such as railway stations, private educational institutions, churches, places of amusement and others, will, if properly designed and advantageously located, add character and distinction to the city and are entitled to consideration in the preparation of the original plan.

CHAPTER V

THE TRANSPORTATION SYSTEM

THE modern city owes, in most cases its genesis, and in all cases its growth and prosperity, to its facilities for internal communication and for easy access to its sources of supply and to markets for the disposal of its manufactured products. A globe trotter who had developed greater powers of observation than thought is said to have remarked that during his travels he had noticed that, by some wise provision of Providence, wherever there was a great center of population or industry, there was usually a navigable river or an arm of the sea and advantageous locations for railways to connect it with other parts of the country. While this is conspicuously the case with industrial towns, it is true to an equal extent of all great centers of population. The need of giving the fullest consideration to the general problem of transportation in the original planning of a city or its various additions has been emphasized in the preceding chapter, but the most that can be accomplished by such study will be to render it possible to provide for the expansion of transportation facilities as required with a minimum of disturbance of the general city plan. If due provision shall have been made for getting passengers and goods into and out of the city, manufactories and general business will be attracted and population will increase, and as the city grows the problems of internal communication must be solved. As business increases the central portions of the town will be given over to it, the land will become too valuable for residential use, and those who had their homes in these districts will move further out. The workmen who find employment in the mills and shops will, unless proper houses are provided for

them in the vicinity of their work, go as far as the time consumed and the rate of fare will permit in order to secure decent homes for their families on terms that they can afford to pay either as home owners or tenants. The results of such shifting of population, while presenting some serious problems, are beneficial. In the report of the London Traffic Branch of the Board of Trade, for 1913, it is stated that "no one can doubt the benefit conferred on the community by the migration of population which has taken place and is still in progress from the central area to the healthier and happier surroundings on the outskirts, and this beneficial process can best be stimulated by the provision of such additional traveling facilities as will enable new and more distant areas to be opened up for building." There is not infrequently a feeling that residence outside the city limits by those whose daily occupation is within the city should be discouraged and that the growth of towns beyond the city lines is detrimental to the best interests of the city, for the reason that everyone who derives his income from the city's activities should contribute through taxation and the trade resulting from his domestic establishment toward the expense of the municipal government and the business of the city shops. This feeling is due to a lack of appreciation of the extent to which every town and hamlet outside of an important urban district stimulates its growth and ministers to its prosperity. Ample facilities to enter and leave a city are as important as those for intercommunication between the different parts of the same city. In a paper presented to the City Planning Conference in Chicago, in 1913, Mr. Milo R. Maltbie points out that the city which has the best transportation facilities by land and water is the one which will increase most rapidly, and that "the city which has the cheapest, most rapid, and most convenient facilities for communication between its various parts is the city, other things being equal, which has the most productive and healthful citizenship."¹

It is true that the districts immediately adjacent to railroads

¹ Proceedings Fifth National Conference on City Planning, 1913, page 107.

are not usually attractive and they are commonly more shabby and unsightly than they need be. They are naturally adapted to manufacturing but they are too frequently given over to the poorer classes of houses. Mr. Edward H. Bennett has observed that "where many railroads radiate from the city in different directions, the triangular-shaped areas lying between them for a considerable distance out from the center of the city are reduced to a low level of utility, even though they may have comparatively high values in the real estate market, and in these pockets are found the worst tenements and slums."

If the general ground plan of a city has been laid out with due regard for the entry into it of trunk line railroads with ample terminal facilities and for such connecting lines as will provide for the economical and expeditious handling of freight and with spurs to serve industrial plants, and if the water front has been so planned as to provide for the convenience of shipping and for ready intercommunication between rail and water traffic, those facilities will be provided, as the demand for them grows, with a minimum of expense and disturbance of ordinary business. In the English-speaking countries the railways are still owned and operated by private corporations, but there is a growing tendency toward the municipal control and in some cases the construction and ownership of terminals, the facilities of which are open to all railroads and ships on equal terms. Seaport cities have been slow to appreciate the need of the proper correlation if not the unification of rail and water terminals. They appear to have proceeded under the idea that the material brought into the city is for home consumption, or is to be transformed into manufactured products before it is transhipped to interior points, and have not appreciated the importance of their functions as distributing centers. Railroad terminals are often planned as if there were no other means of transportation. Shipping terminals are likewise designed as though railroad connections were of little or no importance. Only recently has the problem of port organization attracted the attention which it deserves. Many of the European cities

have been studying and working out their transportation problems for years, and their recent rapid increase in population and wealth is due in great measure to their generous provision for water and rail terminals.

The development of the commerce of the ports of Hamburg, Bremen and Antwerp has been phenomenal. Mr. Clapp in his book descriptive of Hamburg¹ says that the Hamburg-American line started in 1847 with a sailing ship of 717 register tons called the "Deutschland," which was the pride of the city, while in 1914 this company had the world's two largest ships, the "Imperator" and the "Vaterland," each of about 50,000 tons. It has required a vast expenditure to improve the harbor and the channel leading to it in order that these great ships and the large number of other vessels frequenting the port may be accommodated. Mr. Clapp says that from 1850 to 1906 Hamburg spent 62,000,000 marks in improving the channel of the Elbe between the city and the sea, and that the cost of constructing the harbor has been 400,000,000 marks, this including 9,500,000 marks for the harbor works at Cuxhaven at the mouth of the river, but not including the Free Port warehouses. The new piers of the Hamburg-American line were built by the city at a cost of 32,000,000 marks and are leased to the company at an annual rental of 1,350,000 marks, representing slightly less than $4\frac{1}{4}$ per cent. on the investment. The water area of the harbor in 1909 is said to have been 1575 acres, made up as follows:

WATER AREA OF HAMBURG HARBOR

	ACRES
Basins for sea ships	723
Basins for river barges	375
Canals and branches with sea-ship depth	36
Canals and branches with barge depth	103
Main stream and entrances to basins.	338
Total	1575

¹ "The Port of Hamburg," by Edwin J. Clapp, 1912.

Hamburg does not consider her shipping terminal as one enterprise and her railroad terminals as another. They are intimately related and efficiently operated as a single unit. (Pl. 5.)

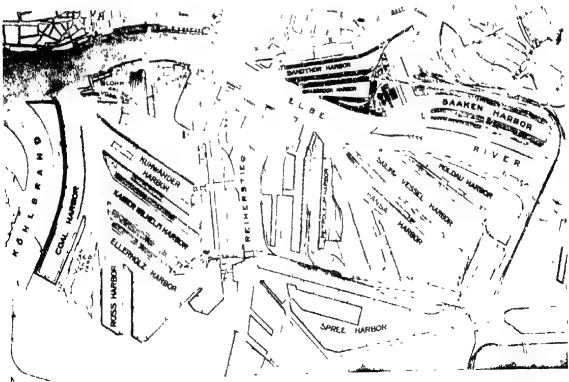
Antwerp is second only to Hamburg among the ports of Europe in the amount of its sea-going tonnage. Extensive improvements and additions are being made to its harbor, which include a change in the course of the Scheldt by which two sharp turns will be removed, while the old channel, separated from the new by dykes with locks, will provide a tideless basin six miles long for an anchorage. When completed the harbor will include 1750 acres of water area. There are about 75 acres of sheds on the wharves, each with its railroad tracks, from one to three of which are usually placed between the shed and the edge of the quay. Railway tracks and warehouses are provided for all about the harbor, while a great boulevard is planned to run through the harbor reservation. Distinctive features of the Antwerp water front are the "Promenoirs" or elevated terraces built over the dock sheds on the Quai Van Dyke and the Quai Jordaens, which are much frequented by the people of the city and which afford an extensive view of the busy harbor.

The remarkable thing about the ports above named is that they are located miles from the sea on rivers that have to be constantly dredged at enormous cost to maintain a sufficient depth of water for the accommodation of shipping and deepened as larger vessels are built. Hamburg is some 85 miles up the Elbe, Bremen about 75 miles up the Weser, Antwerp is on the Scheldt 60 miles from the sea, and all of these cities have harbors and channels leading to them which can float the largest ocean liners.

The case of Frankfort is more remarkable still, although this port is confined to river traffic and can be reached only by vessels of small draught. Located on the river Main about 25 miles from its confluence with the Rhine, which is, in turn, more than 300 miles from the mouth of the latter at the Hook of Holland, Frankfort has always been a prosperous city with a large inland trade, but to make itself an important terminal

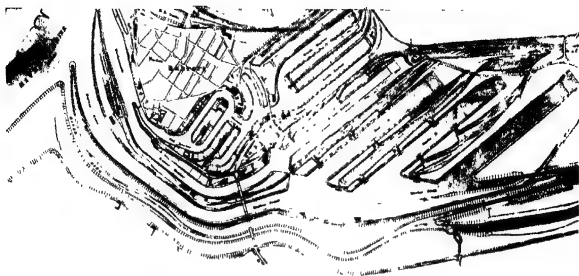


The shaded portions of this plan show where grades were changed in the removal of the Pittsburgh "Hump." The black indicates the widening of old and the cutting through of new streets. Reproduced from plan kindly furnished by Mr. N. S. Sprague, Superintendent of Construction (p. 30).

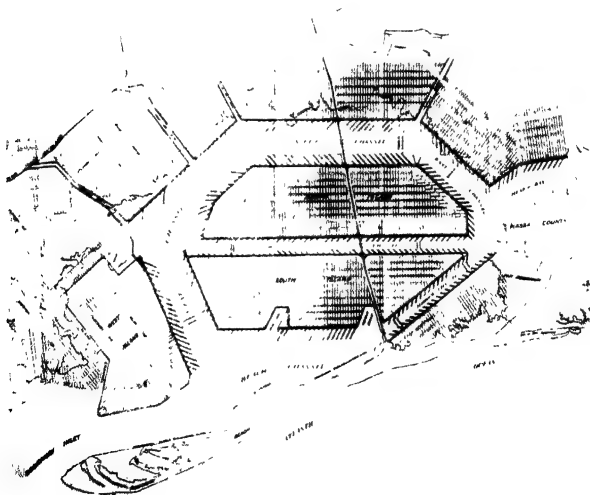


Plan of a portion of the harbor of Hamburg, 85 miles from the sea. Reproduced from report of the New York Barge Canal Commission (p. 58).

PLATE 6



The harbor of Duisburg-Ruhrort, probably the greatest inland harbor of the world. Note the complete co-ordination of rail and water terminals. Reproduced from the report of the New York Barge Canal Commission (p. 66).



A plan for the improvement of Jamaica Bay, New York, by the creation of a great harbor at the back door of the city with a direct inlet from the ocean. Reproduced from the report of the Jamaica Bay Improvement Commission (p. 67).

where rail and water lines meet and so to co-ordinate these lines as to offer what are said to be among the best and cheapest manufacturing sites in all Europe. required vision and courage of a high order, which, however, were characteristic of Ober-burgermeister Adickes and his associates in the city government. On what is known as the new East Harbor the city has spent some \$18,000,000, a third of which was for real estate, a half for construction and the rest for warehouses, equipment and interest on capital during construction. This development covers 1180 acres, of which 350 acres are devoted to streets, railways and embankments, 110 acres to water basins, and the remaining 720 acres to sites for storage and handling of freight, warehouses and industrial plants. All of these industries are to have adequate connections with the railway system. The property for this development was purchased before it took on a speculative value. The purpose of the city was to lease rather than sell the industrial sites, but finding it difficult to do so it is selling them on terms which, while liberal financially, contain rigid restrictions. As stated in the report of the New York State Barge Canal Terminal Commission: "In the case of sale the city protects itself against the possibility of speculation by providing in the contract a condition that the site may only be used for a certain purpose, previously agreed upon. The industry must be established within a fixed period, previous to the expiration of which the plot is not allowed to be resold. Should an attempt be made to disregard these conditions, then the city has a right to demand the return of the site, without compensation for the loss of interest."

Rotterdam has been brought within 14 miles of the sea by a new channel made by the Dutch government at a cost of \$1,750,000, while the city itself is spending large sums for the extension and improvement of its harbor which now has an area of over 500 acres and, when the additions are completed, will cover about 1300 acres. Here, too, the railway tracks are brought to every dock, basin and warehouse, so that it is a combined shipping and rail terminal.

A particularly good illustration of the complete co-ordination of rail and water transportation facilities is offered by the remarkable harbor of Duisburg-Ruhrort on the Rhine 135 miles above Rotterdam and 45 miles above the boundary between Holland and Germany. This is said to be the greatest inland port of Germany if not of the world. The district of Rhenish Westphalia, of which it is the commercial center, is thus described in the report of the New York Barge Canal Commission: "A closely woven network of railroads covers the entire region; coal mine succeeds coal mine; chimneys, elevators, heaps of mine refuse are everywhere to be seen. Thickly populated cities and centers of trade lie close together, humming with industrial activity. Furnaces, iron and steel works, foundries, factories, zinc and copper-smelting works and many manufactories, some of them of the largest, unite in making a picture of industrial development unrivaled in all Europe." In 1890 there were 37 miles of railroad tracks connecting with the docks and this mileage was increased from 1903 to 1908, when over \$5,000,000 were spent in improvements. The intimate connection between railroads and water front is shown by the illustration on Pl. 6 (p. 59), which, however, shows only a portion of the harbor.

One other Continental port will be referred to, that of Havre. As the average tidal range here is 17 ft. with an extreme of 29 ft., closed docks are necessary. There is an outer harbor of 175 acres and ten inner basins with a combined water area of 200 acres. The French government has supplied half of the funds for the harbor improvements, the other half being furnished by the city. Railroad tracks run alongside of the vessels and freight is handled cheaply and expeditiously.

London is 50 miles from the mouth of the Thames, yet its port, which is under the control of a public trust or monopoly called the "Port of London Authority," is one of the most highly developed in the world. The docks and wharves under the control of this body have an appraised value of some \$185,000,000, and the earnings in the shape of dues collected

is supposed to provide for interest and amortization on this sum and whatever additional amounts may be required for renewals and extensions. There are 37 wet docks or tidal basins and in these about one-half of the water-borne commerce of the port is handled. The docks include a total land and water area of 2467 acres, a river frontage of about three miles, 28 miles of quay walls, and about 120 miles of railway. As the tidal range in London is from 17 to 20 ft., the docks are provided with gates. The Tilbury docks, which are the most modern, are about 23 miles below London Bridge, and include four wet docks having a length of 1600 ft. each and widths of from 250 to 600 ft. and a tidal basin, all with a depth of 45 ft. below high water, the combined water area being 73 acres. Between the tidal basin and the wet docks, there is a lock 700 ft. long divided into two chambers having lengths of 145 and 555 ft. respectively. Sheds and warehouses with railway tracks and hydraulic traveling cranes are located along all the quay walls.

The docks of Liverpool and Birkenhead, which form a single port, cover a total area of 1677 acres, of which 599 acres are water with 36 miles of quay walls all provided with warehouses, sheds, railway tracks and freight-handling machinery. There are 73 wet docks and basins and 21 graving docks. The tidal range at Liverpool is from 21 to 35 ft., necessitating the most costly and substantial construction, while constant dredging in the Mersey River and over the bar at its mouth four miles below the docks is a large item in the cost of the port improvement and maintenance, upon which a total of \$200,000,000 has been expended.

Manchester, an inland city, has become an important seaport by connecting itself with the Mersey River by means of a canal having a length of $35\frac{1}{2}$ miles and a width of from 290 to 370 ft. with 26 ft. depth of water. Its docks cover 406 acres, of which 120 acres are water. There are $6\frac{1}{2}$ miles of quays and 10 miles of railways reaching every part of the docks and affording rail connection with every part of Great Britain.

This enterprising city has expended no less than \$85,000,000 to convert itself into a seaport.

The two great capitals of South America have shown foresight and enterprise in improving their transportation facilities, which have been surpassed by no other cities. Dr. E. L. Corthell, the well-known engineer who has been so conspicuously identified with harbor improvements in South America and other parts of the world, has furnished the author with some interesting data concerning these cities.

Buenos Aires is older than any of the cities of North America, having been founded in 1535. While located on a broad estuary about 140 miles from the Atlantic Ocean, the water in front of the city is so shallow that vessels of any size were formerly obliged to anchor about twelve miles from the shore and transfer their passengers and cargoes by small boats. This method prevailed until 1889 when a system of docks and channels leading to them, which were begun four years earlier, were available for use. There are two channels, one having a depth of 19 ft. and the other of 21 ft. at low water, coming together about $5\frac{1}{2}$ miles from the shore. Four great connecting docks were built, each over 2000 ft. long and more than 500 ft. wide, with 23 ft. of water at low tide and with a basin at both ends. The docks are furnished with tidal gates to maintain the above depth of water when the tide is exceptionally low. Across the channels connecting the docks are swing bridges for the accommodation of vehicular and pedestrian traffic. The channels leading to these docks are 320 ft. wide. The original works cost about \$40,000,000 in gold, but extensive additions and improvements since made or in progress at a cost of \$20,000,000 will add greatly to the capacity of the harbor, the new docks having a depth of 30 ft., and the channel leading to them being dredged to the same depth.

The effect of these improved facilities upon the business of the port and the growth of the city was not only instantaneous but has been, perhaps, unprecedented. Dr. Corthell says: "When the project was first brought forward in 1880, the tonnage of

the port was not over 700,000. The plans contemplated 2,000,000 tons which was considered extravagant by some people. When the docks were opened for traffic in 1899, it had grown to 3,800,000; in 1901 it had reached 8,661,000, and it is now, in normal times, well up to 12,000,000. The commercial facilities have had much influence upon the rapid increase in population. In 1864 it was 140,000; in 1887, 400,000; in 1902, 864,000; in 1914 about 1,500,000." Buenos Aires realized that provision for water-borne commerce would fail of its purpose unless the water terminals were properly correlated with rail transportation lines, so the "Port Railway," owned and operated by the Federal Government of Argentina, provides direct access to both sides of every dock for the various railway lines connecting with it and leading to every part of the country.

Rio de Janeiro, founded in 1556, is located on a bay having an area of about 250 square miles surrounded by beautiful shores with lofty mountains affording the most strikingly picturesque site of any of the world's great cities. While the water front has been availed of to create one of the most remarkable driveways ever built, the needs of commerce have not been neglected and within the last few years a quay wall $2\frac{1}{2}$ miles long has been constructed, the space behind it has been filled in, and on this space has been built a great system of warehouses and sheds provided with electric cranes and railway tracks. In front of the wall is a large anchorage to which a channel 33 ft. deep has been dredged. (Pl. 7, p. 66.)

Along the Pacific coast of North America, both in the Dominion of Canada and in the United States, ambitious projects are under way and vast sums have been and are to be expended to prepare for the increased commerce which is expected to follow the completion of the Panama Canal. The *London Times* of November 13, 1913, estimated that no less than \$500,000,000 was being expended for this purpose--\$350,000,000 by railway and private companies in building up harbors, terminals and rail connections, the greater portion at the ports of British Columbia, and \$150,000,000 by the United

States Government, cities and port and harbor boards. According to the statement above referred to the Vancouver Harbor and Dock Extension Company had let contracts for 25 miles of dockage at a cost of \$30,000,000, while the Dominion Government was spending \$2,500,000 more. Prince Rupert had provided \$3,000,000 for docks and the Dominion Government a similar amount for a floating dry dock and for deepening the bay. Victoria was building the Panama docks at a cost of \$2,500,000 and the Dominion Government was constructing a break-water half a mile long flanked by two 1000-ft. docks at a cost of \$4,000,000, and was about to build what are said to be the largest dry docks in the world at an estimated cost of \$8,000,000. Seattle was spending \$8,000,000 for docks, while the State and Federal Governments were devoting \$5,000,000 to canals to connect Lakes Washington and Union with Puget Sound, and in addition to this various county and river commissions were spending \$3,000,000 in straightening and deepening the Duwamish River. Tacoma had provided \$4,000,000 and the Federal Government \$500,000 for dredging channels, including a six-mile canal to develop a vast area of tidal flats, while other towns on Puget Sound were spending \$1,000,000 in dock construction. The port of Portland was said to be devoting \$7,000,000 to channel work and the city \$2,500,000 for docks and warehouses, while the United States Government was building a break-water at the mouth of the Columbia River at a cost of \$10,000,000 and deepening the 110 miles of river from Portland to the bar. San Francisco had provided \$10,000,000 for dock improvements, while the Federal Government had appropriated \$500,000 for improving the channels; and Oakland, across the bay, had appropriated \$5,000,000 for water-front development, while the Federal Government was constructing a channel 500 ft. wide and 30 ft. deep, reaching almost to the business center of the city, at a cost of \$7,000,000. Los Angeles, 20 miles inland with no natural harbor, has made itself a seaport by "shoestring" annexes, and is spending \$10,000,000 on docks in the harbor formed by a

break-water two miles long constructed by the Federal Government. (Fig. 4.) San Diego, 90 miles south of Los Angeles, has a natural land-locked harbor and is to spend \$4,000,000 in

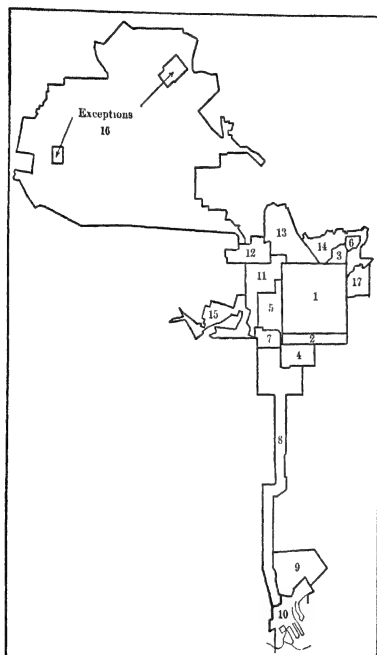
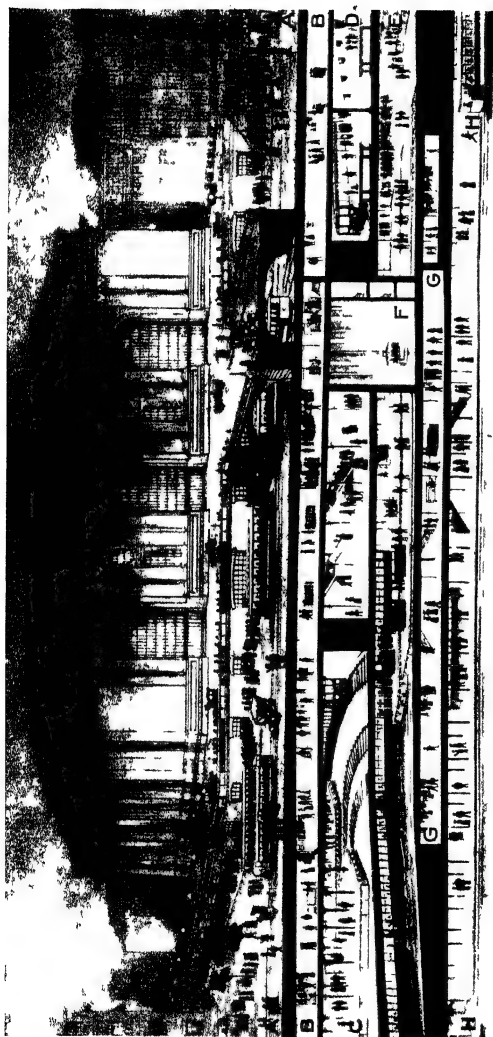


FIG. 4.—Showing the successive additions to Los Angeles. The date and area of each addition are shown by Table X, p. 204. Prepared from map and information kindly furnished by Mr. Homer Hamlin, City Engineer.

improving its dock facilities, while the Federal Government is dredging and building a sea wall at a cost of \$800,000.

While the great projects above referred to, in which municipal, State and Federal Governments are participating, may not be considered city planning in the ordinary acceptance of the term, they have been cited as indicating the immense impor-



The Grand Central Station New York and its connection A Surface of Fort St. Vrain street B Upper concourse connecting with subways C Main and 42nd Street subway D New Lexington Avenue subway E Hudson and Manhattan Subway to New Jersey F Elevators G Lower concourse connecting with subway H Steinway tunnel to Long Island Reproduced from photograph kindly furnished by the Public Service Commission (p 76).

bay on a long trestle. In 1906 a commission was created to study and report upon the possibility of converting this bay into a harbor. The illustration on Pl. 6 (p. 59) shows one of the plans suggested by this commission and indicates the wonderful opportunities which are here presented. The plan is little more than a sketch and has not been worked out in detail, and it is quite apparent that the need of more adequate railroad facilities in connection with a water-front development of such magnitude has not been appreciated. The plan suggests railway tracks along the quay walls with spurs running out on the piers, but there is no provision for the extensive classification and storage yards which would be required in connection with such a great water terminal. The Federal Government investigated the feasibility of the project, and an agreement was made with the city of New York to the effect that, when the city should have provided \$1,000,000 toward the cost of the improvement, the government would undertake to dredge the main channels, or, if the city did the work of dredging, the government would allow the city, eight cents a cubic yard for all material removed. The first contract which was made was for a price slightly under eight cents a cubic yard, so that a beginning of the physical work was made without expense to the city. The dredged material can be used to fill in the low lands adjoining and make them suitable for industrial development, and the city's funds can thus be devoted in large part to the acquisition of the bordering land and the creation of the subsidiary channels. The problem of maintaining the inlet from the ocean has given much concern to the Federal authorities and is not yet completely solved. An essential feature of the project will be the provision of adequate connections with trunk line railroads, so that all can be accommodated on equal terms, and to insure this such a line should be controlled, if not owned and operated, by the city.

Speaking of the possibilities of such an improvement and the unusual opportunity offered, Dr. E. L. Corthell says: "The area and the frontage of Jamaica Bay would take in comfortably some of the largest ports in the world, and in any European

country would be eagerly occupied for commercial purposes when as near to existing ports and as accessible as this is to New York. It is just as important to ameliorate the industrial conditions as to furnish additional commercial facilities. It goes without saying that if industries can have, within a distance from the new Municipal Building of New York city no greater than from there to Central Park, large tracts of cheap land on a deep water front, available to ocean, interior and coastwise navigation and to railroad facilities, manufacturers will eagerly seek such a locality."

When a city is served by a great number of trunk line railroads, of which Chicago is probably the most conspicuous instance, and when nearly all of these lines have their termini in such city, it is quite likely that each will have established its terminal independently of the others, and that subsequent connections between them will be difficult and costly. There will be a great number of terminals, those for passengers often having commodious and handsome stations, while those for freight are, as a rule, unsightly and exercise a blighting influence upon the parts of the city in which they are located. Chicago has six separate passenger terminals within the limited area known as the "loop district," and, while the extraordinary growth of the city could not have been anticipated when the original city and its successive additions were planned, the problem of so connecting the various lines as to reduce the number of separate terminals and the cost of transferring freight and passengers differs only in magnitude from that presented in any other railroad center. The civic committee of the City Club of Chicago has made a careful study of this problem and with its permission several of the plans included in its valuable report are reproduced. Fig. 5 shows the maze of railroads entering and traversing the city, each one of which must have a serious effect upon the adjacent property, condemning it to a kind of occupancy and a character of improvement which will give it a distinction for ugliness if it does not produce a succession of slums. In the report above referred to,

which was prepared by Mr. George E. Hooker, Civic Secretary of the club, the manner in which this jumble of railroad lines has grown up is described as follows: "The criss-crossing of railway lines—each line an independent enterprise and welcomed

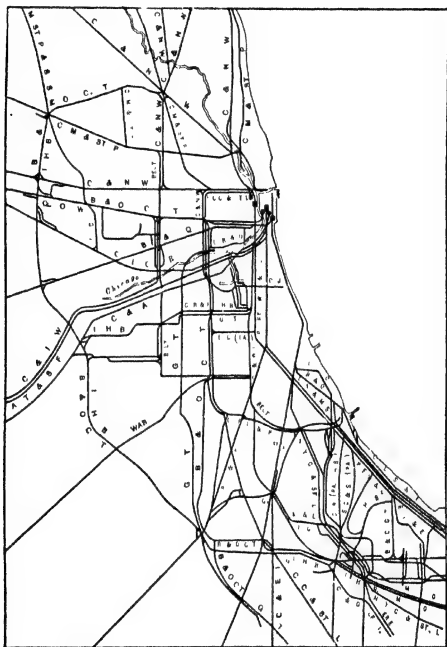


FIG. 5.—Plan showing the different trunk line railroads entering the city of Chicago, each on its own right of way. This and Figs. 6 and 7 are reproduced by permission of the City Club of Chicago from a report made by that body.

as such by a land-speculating public,—which began so conspicuously in the fifties has continued and grown until we have our present network of steam railroads, one of the most remarkable examples of chaos ever produced by human activity." The passenger terminals are badly scattered and, while some

occupy beautiful stations with every device for the convenience and comfort of passengers, and some of them are used by several lines, through passengers are compelled to traverse the streets from one station to another unless the outgoing line happens

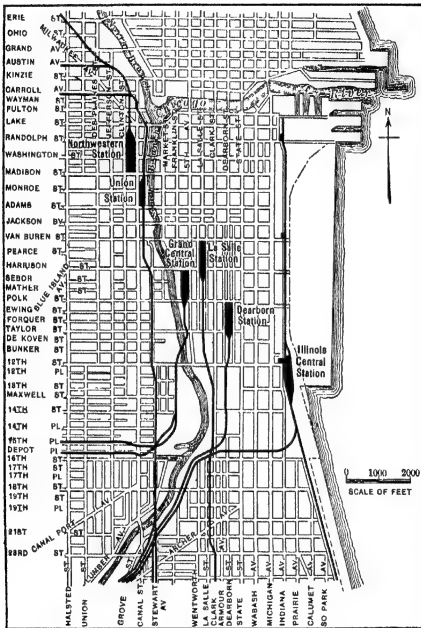


FIG. 6.—Plan showing location of the six passenger railway terminals of Chicago,

to use the same station as does the line by which they arrive. (Fig. 6.) One of the trunk lines occupies the lake front, making it exceedingly difficult for the city to carry out its ambitious scheme of water-front parks.

A study has been made for the City Club by Mr. Bion J. Arnold for a simplification of the plan, the economic advantages

of which to the city and also to the railroads are apparent from an examination of Fig. 7. It may be argued that Chicago's wonderful growth could not have been anticipated even by a city planner possessing exceptional imagination, and anyone

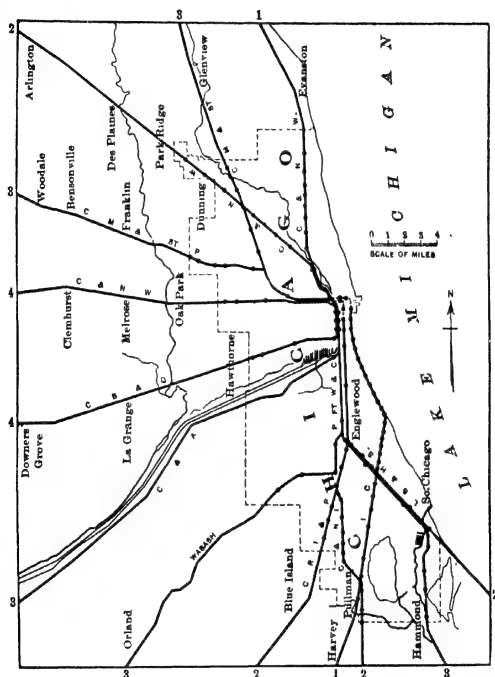


FIG. 7.—Plan prepared by Mr. Bion J. Arnold for the City Club of Chicago to simplify the trunk railroad system, each line being on an existing right of way.

who, even a generation ago, should have attempted to make provision for the accommodation of the enormous railroad business which now exists would have been considered mad. This is doubtless true as to the magnitude of the business, but if all of the railroads had been confined to certain well-defined

and contiguous routes, and if places had been set aside for yards for classification and exchange of freight, it would simply have been necessary to enlarge these facilities, confining them to certain sections instead of allowing them to be scattered over the entire city, multiplying needlessly the number of unsightly spots. It may be urged that a city of nearly two and a half millions of people needs a large number of distributing points, and that the more such points there are the shorter will be the haul through the city streets, but the tracks serving these distributing centers should be open to all lines. If a merchant or manufacturer receives goods from New York or New Orleans or Milwaukee, or if he wishes to make shipments to Pittsburgh or Indianapolis or Denver, he should not be compelled to go to a different part of the city to receive or deliver the goods arriving or leaving by a particular line. He should be able to use the nearest and most conveniently located freight station whatever may have been the origin or whatever may be the destination of his goods or by whatever line they may be carried. This is a fundamental economic principle which holds good whether the town be large or small, whether the transportation lines serving it be few or many. The co-ordination of the railway lines and the distribution of the stations in Berlin is a good example. (Pl. II, p. 79.)

The problem of co-ordinating the railroad lines serving New York is an especially serious one owing to the natural obstacles to their proper connection. The great navigable water-ways which give this city and the district tributary to it a commanding position as a commercial and manufacturing center render the problem peculiarly difficult of solution. But one trunk line railroad, the New York Central, has direct rail connection between the great center of population on Manhattan Island and other parts of the country for the handling of freight, and this system reaches only the northeastern portion of the United States by way of the Hudson River valley. The New Haven road, serving New England, stops at the Harlem River. All of the other lines have their

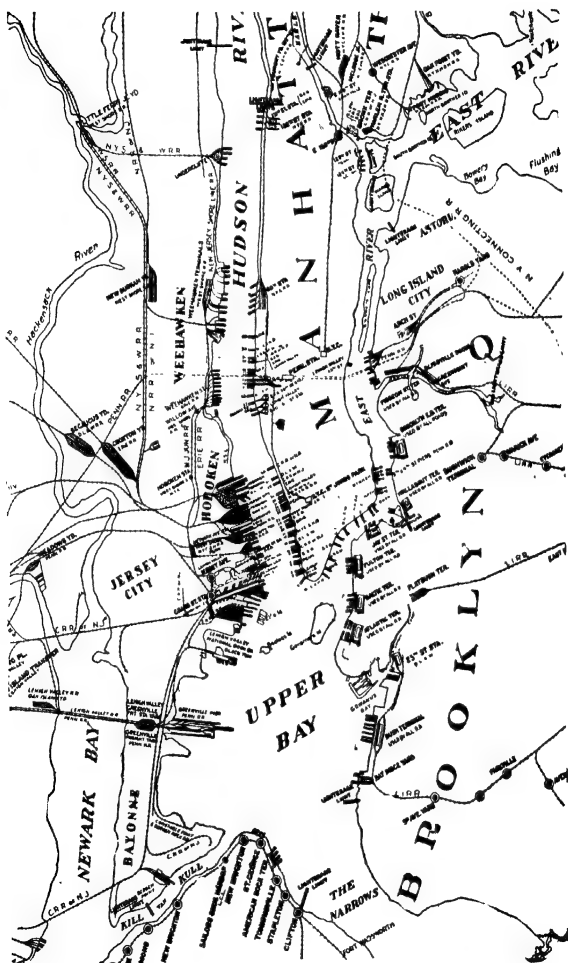


FIG. 8.—Railroad terminals of New York. Freight cars are moved from the rail terminals to the piers shown in black by means of transfer floats. Reproduced from a map published by the Merchants Ass'n of New York.

rail terminus on the west side of the Hudson in the State of New Jersey and transfer their freight cars across the river by means of floats. (Fig. 8, p. 73.) The Pennsylvania Railroad has, at enormous expense, brought passenger business to Manhattan Island by two tracks in ~~under~~ under the Hudson, and has four tracks under the East River to reach its passenger terminal yard on Long Island, where it connects with the Long Island railroad system, which it controls, but it is not allowed, under the terms of its franchise, to use these tracks for freight business. It has established a great freight terminal on the New Jersey side of the Upper Bay at Greenville, and opposite this, in Brooklyn, is the terminus of the New York Connecting Railway which swings around through the boroughs of Brooklyn and Queens and is to connect with the New Haven road and New England by an enormous bridge across the East River with long viaduct approaches. (Pl. 9.)

There are extensive plans for a marginal freight railroad along the water front of the southerly part of Brooklyn, which the city proposes to build and lease for operation to a corporation in which all of the trunk lines will be represented. (Fig. 9.) This line will have no rail connection with any of the roads except by way of the New York Connecting Railroad, above referred to, but will reach all of them by car floats.

There are two great passenger railway terminals in New York city, the Grand Central Station of the New York Central, which also supplies trackage and terminal facilities to the New Haven system, and the Pennsylvania Station, the relative location of which is shown by Fig. 10 (p. 77). While the Grand Central is strictly a terminal or dead-end station, its enormous size permits the serious limitations of such stations to be partly overcome by the use of loops on the two underground levels, the upper for express and the lower for local trains, enabling all trains, after entering the incoming part of the station, to pass around the stub-end tracks to the outgoing side without back-switching (Figs. 40 and 41, pp. 156 and 157). The elaborate yet convenient system of connections between this station and the



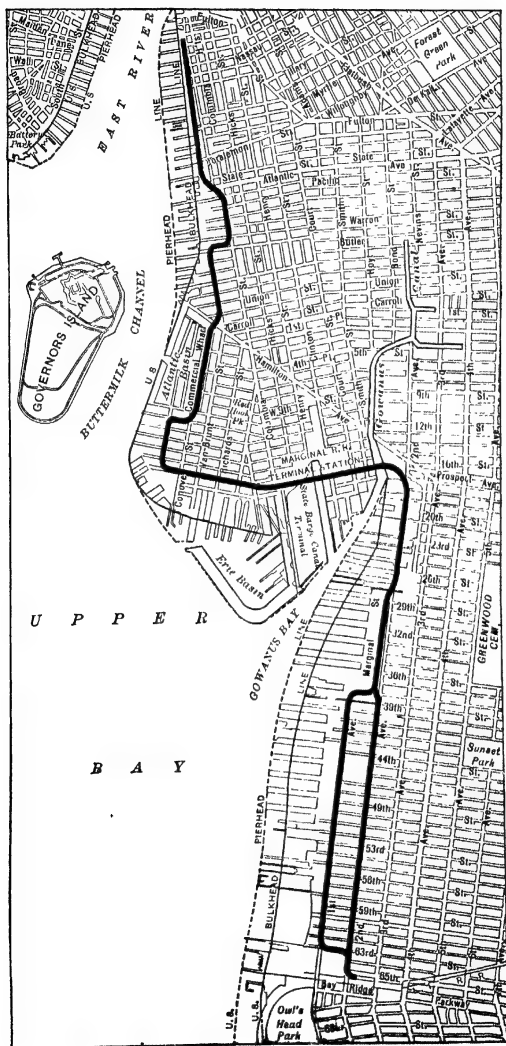


FIG. 9.—Proposed marginal railroad along part of the Brooklyn water front connecting a number of separate terminals and industrial plants.

various underground lines of the city's transit system which reach it is shown by Pl. 8 (p. 67). The introduction of ramps instead of stairways is one of the features of this most modern of the world's great railway terminals. The Pennsylvania Station, while really a terminal for the Pennsylvania lines from the South and West and for the Long Island lines from the East, has the advantages of a through station in its train movement, as all of its trains arriving from the South or West pass through the station and under the East River to a great terminal yard on Long Island. (Fig. 10.) The character of these station buildings and their position with respect to the street system are referred to in the chapter devoted to public buildings.

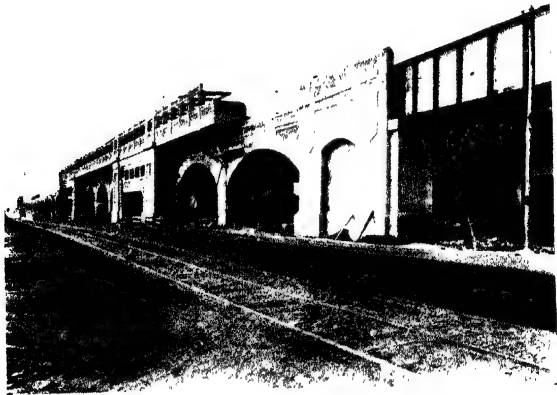
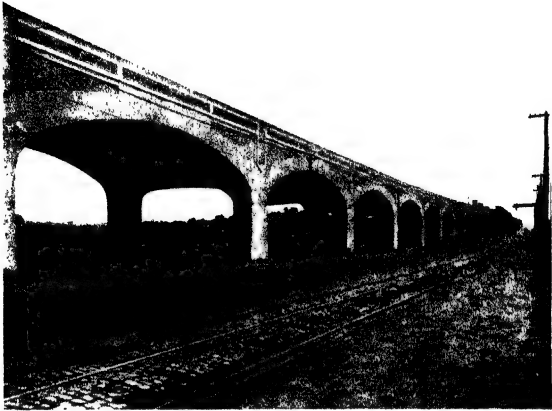
Ample facilities for external communication will stimulate commerce and increase of population will follow. As the population grows the problem of internal transportation assumes greater importance, and the effectiveness of the intra-urban transit system will depend to a large degree upon the city plan. Mr. Maltbie, in the paper already referred to, says: "It seems to have been taken for granted frequently that one may plan a city and then depend upon transportation experts to provide transit facilities; that different areas can be set aside for factories, shops, theaters, offices, residences, parks, etc., and that then some sort of transportation system can be evolved to fit the necessities of the plan. But if conscious city planning is to be substituted for accidental and haphazard development, the two things must go hand in hand; that is, transportation facilities must be considered at the same time that other factors are under discussion. There is a marked tendency among city planners to use curved streets and broken streets, streets that constantly change their direction. From an artistic standpoint these plans are often very successful, and the treatment of the long straight street is a difficult matter, but the old epigrammatic statement that the curved line is for pleasure and the straight line for business holds true today. Cheap rapid transit would be practically impossible in a city wholly composed of curved streets or streets which change their direc-



FIG. 10.—Plan showing the location of the Pennsylvania R.R. station in New York (A), the river tunnels and the yard on Long Island. The New York Central Terminal is at B.

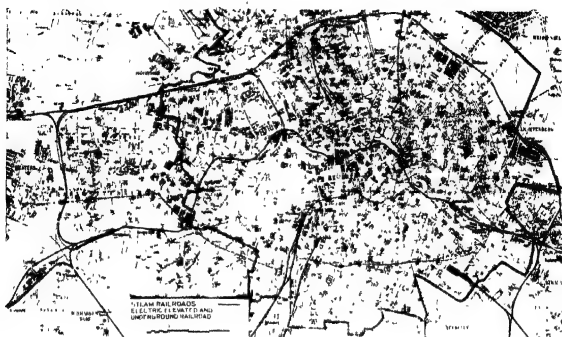
tion at short distances. The cost of construction would be large. Private property would have to be taken at many points. Large cost of construction would mean large fixed charges. Operating expenses would be increased because the loss of current in acceleration and retardation and cost of maintenance and repairs would be heavy. Curves reduce speed; reduced speed means increased time in transit; an increase in time means a reduction in the area which can be served, which in turn is a cause of congestion."

To plan the streets of a city so that any one or all of them may accommodate transit lines would be folly. Some of these lines will be much more intensively used than others, that is, some will be trunk lines and others will be feeders. In a large city the trunk lines will carry such a heavy traffic that its accommodation on the street surface will be impossible unless it moves very slowly, and slow speed means restricted capacity. They must therefore be placed over or under the streets, on elevated structures or in tunnels. Some of the most important lines, also, will need three or four tracks to accommodate the traffic. Elevated railroads offer such serious obstruction to light and air and are so noisy, and, as commonly constructed, disfigure the streets to such an extent that they will not often be tolerated. In the case of the elevated railroad in Philadelphia, which is built with a solid floor and is stone ballasted, the noise has been greatly reduced. If the steel structure is encased in concrete, the disfigurement of the street is much less and the noise can be still further reduced. Of the latter class is the elevated railroad through the Fenways in Boston. The three-track elevated railway in Queens Boulevard, New York city, is composed of a series of arches between piers which are themselves pierced by arched openings designed to accommodate a double track surface railroad. This street is 200 ft. in width, the part in which the elevated railway is located having two roadways each 43 ft. wide, the space between being 74 ft. in width, so that there is room for planting on each side of the elevated structure, which is itself 77 ft. from the side lines of the street, so that there



The 3-track rapid transit railroad in Queens Boulevard, New York. The upper view shows the structure between stations, the lower at stations. Reproduced from photographs kindly furnished by the Public Service Commission for the First New York district (p. 79).

PLATE 11



Plan showing the excellent system of railway terminals in Berlin (p. 72).



Lower Broadway, New York, under which a 4-track rapid transit subway is being constructed without interference with street traffic. This and the views on Pls 12, 13 and 14 are reproduced from photographs kindly furnished by the Public Service Commission (p. 81).

is no obstruction of light and air, while with a solid floor, stone ballast and parapet walls outside the tracks there will be little noise. (Fig. 11 and Pl. 10.) This is probably the best type of elevated railway yet built within street lines. While streets can rarely have such unusual dimensions, if a few avenues leading directly out from the main centers of large cities were given a width of 150 ft., it would be possible to provide elevated lines of this kind which would be far more agreeable to ride on and would cost less to build than subways. Where underground

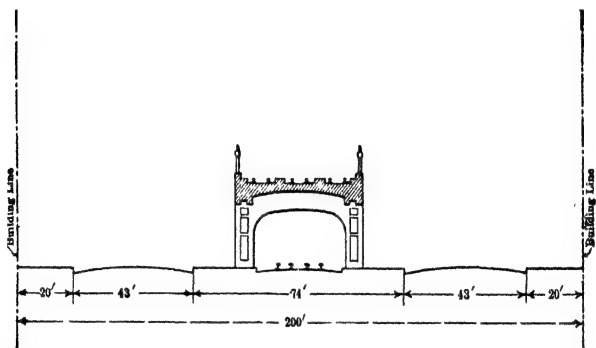


FIG. 11.—Cross-section of Queens Boulevard, New York, with three-track elevated railroad on reinforced concrete structure and surface tracks beneath.

railroads will ultimately be required and where they are built in advance of extensive development and before surface traffic is great, and where streets are sufficiently wide, they can be built in open cuts which need not be covered until the space above them is required for street purposes. In cases where the street width is sufficient the sides can be sloped and retaining walls omitted until the tracks are covered, and the space occupied by the slopes can eventually be used for additional tracks. (Figs. 12 and 13.) The first rapid-transit subway built in New York had for the greater part of its length four tracks, on two of which express trains of ten cars are operated

during the rush hours at intervals of one and three-quarters minutes with stations about one and a half miles apart and on the other two tracks local trains of six cars at the same intervals and with stations about a quarter of a mile apart. With improved safety devices and methods of speed control

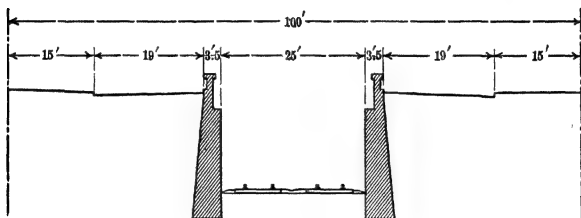


FIG. 12.—Open cut for double-track rapid-transit railroad in street 100 ft. wide; to be converted into a tunnel when necessary.

the capacity of this railroad has been constantly increased until, during the year ending June 30, 1915, the average number of passengers carried each day was 1,016,429, an increase over the previous year of 15,214. The elevated lines have meanwhile been or are being equipped with third or fourth tracks,

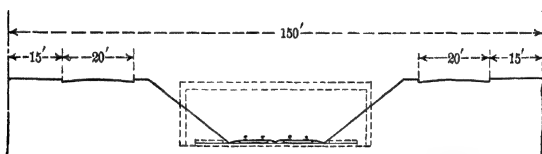


FIG. 13.—Showing open cut for double-track rapid-transit railroad with side slopes in a street 150 ft. wide; to be converted into a four-track underground road when necessary.

permitting, in the former case, the operation of express service in the direction of greatest passenger movement during the rush hours, and in the latter case a complete express service at all hours.

This work is being done in connection with a comprehensive extension of the transit system of the city at an expense of

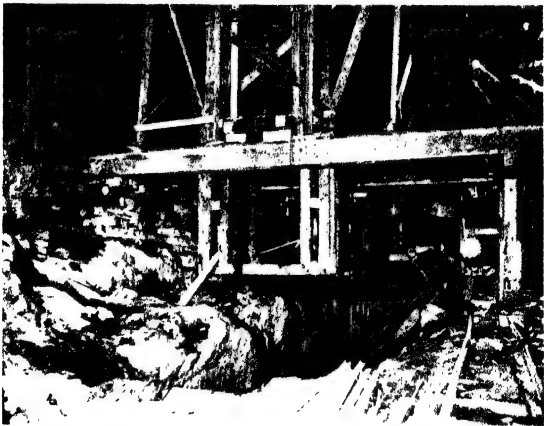
about \$330,000,000, of which sum the city contributes about one-half, and the two traction companies operating the present lines the other half. Heretofore the building of new rapid transit lines has been confined to the parts of the city where population was dense and existing facilities were overtaxed. Under the present plans new lines are being carried into parts of the city which are still undeveloped. The effect of this policy upon taxable values will be very great. There may be a depreciation in certain congested sections where present high values have been brought about by a demand for space which exceeded the supply and congestion has resulted, but new areas will become available for development and there will be a diffusion of realty values with a considerable net increase. The magnitude of this undertaking and the difficulties attending its construction are illustrated by Pls 11, 12 and 13 (pp. 79, 82 and 83). The extent to which the transit facilities of the city are to be increased is indicated by the fact that the present rapid transit system includes a total track mileage, both elevated and subway, of 296 miles, while the enlarged system will amount to 620 miles. The road mileage of the new construction will be 88.86 miles, of which 48.12 will be subway, 36.55 elevated and 4.19 miles will be on the East River bridges, while the road length of the original subway was but 25.72 miles. The total amount of material to be excavated was about 12,800,000 cubic yards, the concrete required 2,850,000 cubic yards, the steel to be put in place was 620,000 tons, and nearly 40 miles of sewers had to be built. On September 1, 1915, it was estimated that about 10,000,000 cubic yards of excavation had been completed, 1,500,000 cubic yards of concrete had been placed and 360,000 tons of steel had been erected or delivered, and that 19,748 men were employed on the work on that date. These lines are supplemented by an extensive system of surface railways which serve as feeders to or distributors from the main system. While elevated railroads were formerly built in some of the most important and intensely developed parts of the city, the recent policy has been to confine them to outlying districts where

property is comparatively low in value and the crying need is transit of some sort which will put these sections in close touch with the business centers. *Rapid* transit is the thing desired, while the manner in which it is supplied, whether over or under the street surface—it cannot be rapid if on the street surface—is a secondary consideration. The relative advantages and disadvantages of underground and elevated railroads have been summarized by Mr. George D. Snyder as follows:

“From the standpoint of the passenger, the elevated is much preferable, as artificial ventilation and artificial illumination during daylight hours are unnecessary, and the passenger has a view from the windows instead of the bare walls of the subway at which to look. From the standpoint of the user of the public thoroughfares and the owner or tenant of abutting property, the underground railway is much to be preferred; and moreover the trains are not subject to delay from bad conditions of weather. An elevated railway is an obstruction in the streets, an eyesore and an interference with the light, air and quietude of its surroundings and, when worked by a steam locomotive, it is a creator of smoke, cinders and dust.

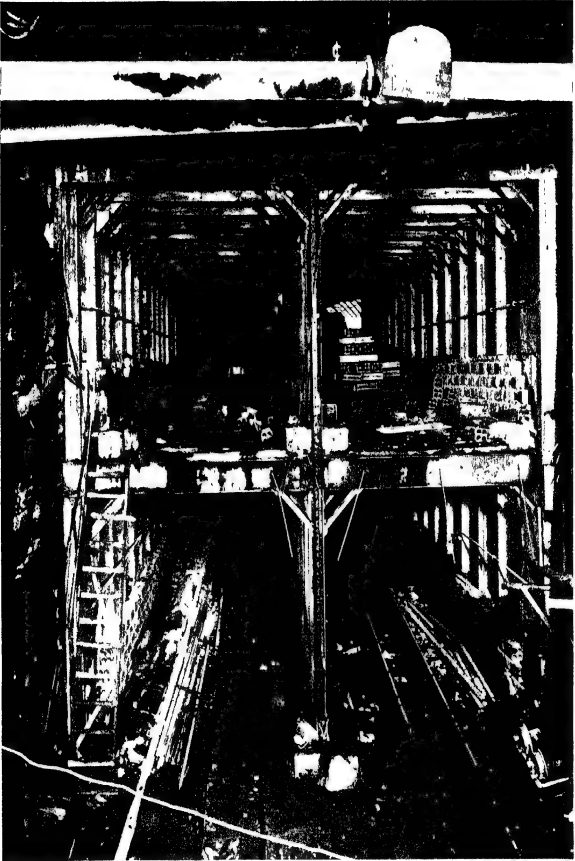
“The first elevated lines were claimed by the owners to be a proper use of the public streets, just as the tramways were, but, after long litigation, the courts have decided that the elevated railways must pay damages on account of interference with light, air and access. In narrow streets, where the property is fully developed with high-class buildings, such damages may equal the difference in cost between an elevated and an underground road; but in some cases the courts, in deciding the amount of damages, have considered the compensatory benefits accruing to the property from its increased accessibility to the business centers. In many quarters the rateable value of property abutting on a street with an elevated railway is greater than in similar adjacent streets without an elevated line.”¹

¹“City Passenger Transportation in the United States,” by George Duncan Snyder. Minutes of Proceedings of the Institution of Civil Engineers, Vol. CXCH.



Building a 4 track, double-deck, rapid-transit railroad under a busy street in New York without interrupting surface traffic. The upper view shows steam shovel work in rock tunnel, the lower shows method of supporting the street in cut-and-cover work (p. 81).

PLATE 13



A 4-track, double-deck, rapid-transit railway under construction with steel erected (p. 81).

The engineering and financial difficulties involved in the construction of an underground rapid-transit line in a narrow street lined with tall buildings is well illustrated by the case of the two-track line now being built under William street, New York (Pl. 14, p. 86). The subway route follows this street for half a mile and some of its features have been thus described by one of the engineers engaged in its construction: "The structure will be of standard two-track type, requiring an excavation about 29 ft. in width, which at stations will be increased to the full width of 40 ft. between building lines to provide for island platforms, from which stairways will extend to a mezzanine passageway connecting with the entrance stairs to the surface. The depth to subgrade will vary from 25 to 31 ft. below the surface, and in general the excavation will extend from three to five ft. below high water, with a maximum of 14 ft. at Maiden Lane and 20 ft. at Pearl street below that datum. As developed by the borings, the material will be coarse sand with some gravel, grading into fine sand which, below ground water, becomes quicksand." The difficulties of the work are reflected in the cost as indicated by the lowest bid which, based upon the preliminary estimate of quantities, was \$2,254,670 or about \$850 a linear foot of subway, the total cost being divided among the following items:

Excavation for subway	\$701,750
Underpinning of buildings.	604,500
Masonry, all classes	248,550
Structural steel	214,800
Sewers.	40,000
All other items.	436,070

Total \$2,254,670

The large proportion of the cost represented by the underpinning and care of buildings will be understood when the narrowness of the street and the character of the soil are taken into account, and from the further fact that along the part of the street to be occupied by the subway there are 45

buildings less than seven stories in height having an assessed valuation of \$7,000,000, 2c from seven to twelve stories high with a value of \$18,000,000 and ten of from thirteen to twenty stories with a valuation of \$15,000,000. It would be difficult to find a more forcible illustration of the need of providing in the plan of a city sufficient streets whose position will make them available for rapid transit routes and whose width will be sufficient to permit the construction of such lines without an expense which would be prohibitive in most cities.

The difficulty and cost of constructing rapid-transit lines in city streets are so great and both are so intensified in narrow streets that the provision of adequate street widths for transit purposes is fully justified. Mr. J. V. Davies has estimated the cost of constructing double-track roads of different types and under varying conditions, these estimates including track and structural equipment, but not including power, rights of way, easements or franchise charges, the figures, which are given in Table III, being reduced to cost per mile of single track.¹

In moderate-sized cities in the United States practically all of the passenger movement will be by means of street surface railroads. The growth of such cities is likely to be more symmetrical than where real rapid transit is supplied; that is, they will, owing to the necessarily limited speed at which cars can move through traffic streets and the length of time required for long trips, grow outward from the central part of the town in all directions where the topography will permit. Under such conditions there should be some means of approximately determining how many transit lines will be required, how far these should be apart and what will be their probable directions. Mr. Daniel L. Turner, Deputy Engineer of Subway Construction of the Public Service Commission for the First District of New York, who has given this question much study, has reached the conclusion that where a city is approximately semicircular in shape or can be reduced to a semicircular equivalent about

¹ "Provision for Future Rapid Transit," by John Vipond Davies, Proceedings of Sixth National Conference on City Planning, Toronto, 1914.

one mile of double-track railroad is required for every 200 acres and that the number of different routes required for any city can be roughly determined by dividing the square root of the area of the city in acres by 6.3, a route being a continuous line from the business center to the outer limits of the city or a cross-town line from one side of the town to the other. He assumes that passengers should not be required to walk more than a quarter of a mile to reach a street railway which will carry them to the business center and that cross-town lines should not be more than a mile apart. Mr. Turner's discussion of this subject is well worth the careful study of those who are responsible for working out the plans for an urban district, in order that streets of adequate width may be provided to meet probable traffic requirements.

TABLE III

SHOWING THE ESTIMATED COST OF DOUBLE-TRACK RAPID-TRANSIT RAILROADS OF VARIOUS TYPES AND UNDER DIFFERENT CONDITIONS, REDUCED TO COST PER MILE OF SINGLE TRACK.

TYPE OF STRUCTURE	COST PER MILE OF SINGLE TRACK
Overhead trolley railroad on public roads or private rights of way, where no pavement is required	\$ 25,000
Overhead trolley railroad in city streets including asphalt or granite pavement between tracks and two ft. outside	41,500
Underground trolley railroad in congested city streets, including pavements, conduits and care of subsurface structures under conditions such as those in Washington, D. C.	48,500
Same construction as above under conditions existing in New York city	126,500
Elevated railroad, steel structure, such as built by the Public Service Commission in New York city, including stations.	113,000
Railroad in open cut, excavation by steam shovel, concrete walls, including bridges and stations.	225,000
Railroad on masonry viaduct, stone ballasted, as on Queens Boulevard, New York city, including stations	330,000
Underground railroad near surface, excavation by steam shovel, little or no interference with subsurface structures, including stations	402,000
Underground railroad in streets like Broadway, New York, extreme interference with subsurface structures, support of surface tracks with underground trolley construction, including stations..	1,190,000
Iron tube tunnels, concrete lined, under waterways or below water level, no stations.	2,700,000

CHAPTER VI

THE STREET SYSTEM

THERE have been a few cases where important cities have been planned as a unit, where the administrative center, the commercial, industrial and residential districts, the lines of traffic and their terminals have been laid out after careful study to meet conditions which could confidently be expected or to a large degree controlled. Washington is probably the most notable instance of such city planning. A site was selected for the national capital of the United States in 1791, when the country consisted of a group of fourteen States strung out along the Atlantic Coast, one State having been added to the original thirteen during that year. The location chosen was at that time fairly central, being on both banks of the Potomac River, and partly in each of the States of Maryland and Virginia. While Washington is still about midway between the northerly and southerly boundaries of the country, it is only about 100 miles in a direct line from the Atlantic Coast and more than 2000 miles from the Pacific. Were the capital city to be located to-day and given a fairly central position with regard to territory and population, it would probably be somewhere along the Mississippi River. The plan of the city, however, is so admirable, its natural surroundings are so attractive, and it has become so beautiful, that although it is at the easterly edge of a country of great territorial extent, no serious suggestion of a change in location has been made.

Plans have lately been prepared for Canberra, the proposed continental capital city for Australia, the competition for the design having been won by Mr. Walter B. Griffin, of Chicago. In this case also a site was selected where there is not even a

developed conform with the haphazard growth which had already taken place. Plans of such cities, therefore, commonly consist of a number of separate designs, more or less unrelated to each other, abutting upon the confused and uneconomic system of streets in the old town which in most cases persisted as the actual center. In some instances expansion in all directions was possible, as in London, Paris, Berlin and Brussels. In others the ancient town was so located that expansion was in a semicircular form, as in the case of Antwerp, or the growth was confined to a single direction, as in that of New York. The considerations which led to the adoption of the present plan of that part of New York city now known as the Borough of Manhattan are outlined in the report which was filed with that plan in 1811, and are interesting reading at this time, when the needs of a great city are more clearly understood. The necessity of a more comprehensive plan was appreciated when in 1807 a commission was created to prepare such a plan. New York then had a population of about 85,600, while the built-up part of the city extended north to approximately Houston street on the east side and Eighth street and Greenwich avenue on the west side, with scattered settlements along both sides of Manhattan Island up to the Harlem River.

The commission was authorized to prepare a plan for Manhattan Island, which had a length of some $13\frac{3}{4}$ miles and a maximum width of about $2\frac{1}{4}$ miles, and they had then a prophetic vision of a great city which would occupy this strip of land, and they felt that it was "no unreasonable conjecture that in half a century it would be closely built up to the northern boundary of the Parade and contain 400,000 souls," a prediction which was more than verified, as in 1860 the population was more than double this estimate, having reached 805,658. The "Parade" referred to extended approximately from Twenty-third to Thirty-fourth streets and from Third to Seventh avenues, and was "set apart for military exercise, as also to assemble in case of need a force destined to defend the city."

One of the first questions considered by the commission

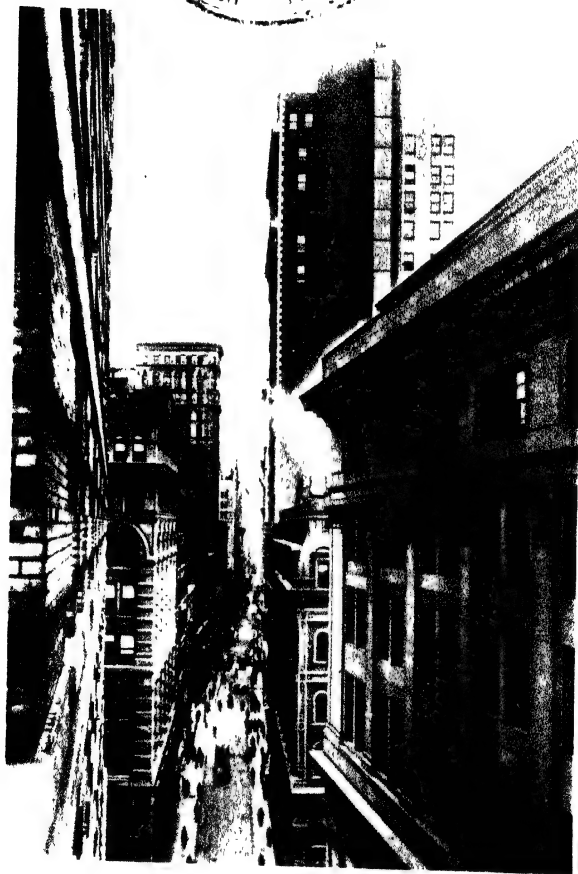
was "whether they should confine themselves to rectilinear and rectangular streets, or whether they should adopt some of those supposed improvements by circles, ovals and stars, which certainly embellish a plan, whatever may be their effect as to convenience and utility." The conclusion reached by them was that "a city must be composed principally of the habitations of men, and that straight-sided and right-angled houses are the most cheap to build and the most convenient to live in. The effect of these plain and simple reflections was decisive."

Having decided upon a rectangular, or gridiron, plan as the most desirable, they appeared to conclude that, as the traffic of the city would be principally across the island, or from river to river, the greatest number of streets or the greatest traffic capacity should be in this direction, and a series of streets 60 ft. in width, with intervening blocks 200 ft. wide, was laid out in this direction, although, realizing that some of these cross streets would be called upon to accommodate a concentrated traffic, fifteen of them, or approximately every tenth street, were given a width of 100 ft. At right angles to these streets and running in straight lines along the length of the island a series of avenues was laid out with a width of 100 ft. each and separated by blocks ranging from 650 to 920 ft. in length. The assumption that the principal traffic would be from river to river may have been a natural one when this plan was made, but it is found to have been a serious and costly blunder. Yet this plan has admirers who point to the dignity and character of the long straight avenues of Manhattan Island. Mr. Simeon Strunsky, in paying his tribute of admiration to Fifth avenue and incidentally to the general street plan of this part of New York, says:

"I know that this will seem very crude to the æsthetic snobs who are always deploring the checker-board plan of Manhattan Island, with avenues that run up and down and streets that sprint from river to river. They call the pattern monotonous because they see it only on the map. . . . Criticism of our gridiron city is only a way people have of echoing the English, who like to have their streets like their education bills and franchise

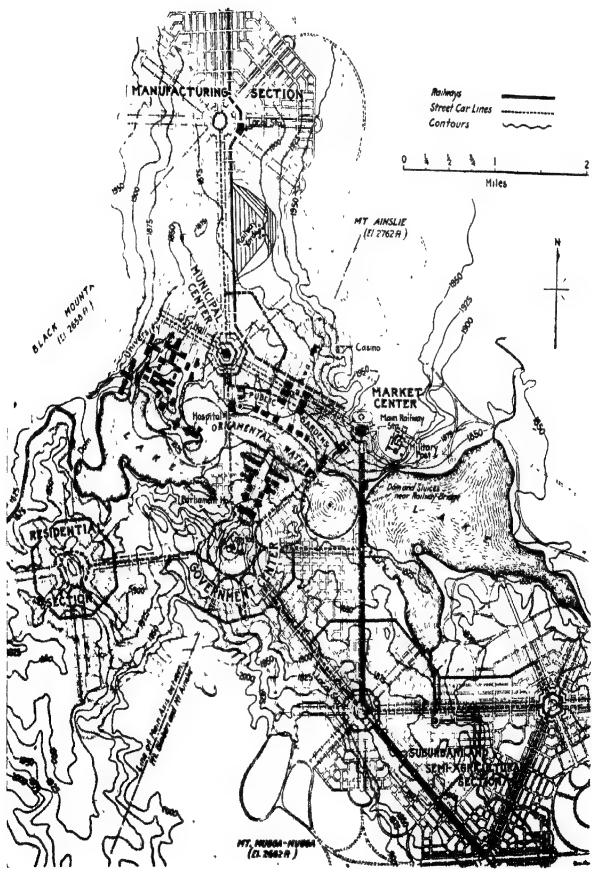
8 - JAN 1934

PLATE 14



View of William street New York, under which a double track rapid transit subway is being built which, at stations, occupies the entire width of the street (p. 83).

8 - JAN 1934



Plan for Canberra, the proposed Capital City of Australia. The accepted design by Mr. Walter B. Griffin of Chicago. See Plate 18, p 132 and p 86.

developed conform with the haphazard growth which had already taken place. Plans of such cities, therefore, commonly consist of a number of separate designs, more or less unrelated to each other, abutting upon the confused and uneconomic system of streets in the old town which in most cases persisted as the actual center. In some instances expansion in all directions was possible, as in London, Paris, Berlin and Brussels. In others the ancient town was so located that expansion was in a semicircular form, as in the case of Antwerp, or the growth was confined to a single direction, as in that of New York. The considerations which led to the adoption of the present plan of that part of New York city now known as the Borough of Manhattan are outlined in the report which was filed with that plan in 1811, and are interesting reading at this time, when the needs of a great city are more clearly understood. The necessity of a more comprehensive plan was appreciated when in 1807 a commission was created to prepare such a plan. New York then had a population of about 85,600, while the built-up part of the city extended north to approximately Houston street on the east side and Eighth street and Greenwich avenue on the west side, with scattered settlements along both sides of Manhattan Island up to the Harlem River.

The commission was authorized to prepare a plan for Manhattan Island, which had a length of some $13\frac{3}{4}$ miles and a maximum width of about $2\frac{1}{4}$ miles, and they had then a prophetic vision of a great city which would occupy this strip of land, and they felt that it was "no unreasonable conjecture that in half a century it would be closely built up to the northern boundary of the Parade and contain 400,000 souls," a prediction which was more than verified, as in 1860 the population was more than double this estimate, having reached 805,658. The "Parade" referred to extended approximately from Twenty-third to Thirty-fourth streets and from Third to Seventh avenues, and was "set apart for military exercise, as also to assemble in case of need a force destined to defend the city."

One of the first questions considered by the commission

was "whether they should confine themselves to rectilinear and rectangular streets, or whether they should adopt some of those supposed improvements by circles, ovals and stars, which certainly embellish a plan, whatever may be their effect as to convenience and utility." The conclusion reached by them was that "a city must be composed principally of the habitations of men, and that straight-sided and right-angled houses are the most cheap to build and the most convenient to live in. The effect of these plain and simple reflections was decisive."

Having decided upon a rectangular, or gridiron, plan as the most desirable, they appeared to conclude that, as the traffic of the city would be principally across the island, or from river to river, the greatest number of streets or the greatest traffic capacity should be in this direction, and a series of streets 60 ft. in width, with intervening blocks 200 ft. wide, was laid out in this direction, although, realizing that some of these cross streets would be called upon to accommodate a concentrated traffic, fifteen of them, or approximately every tenth street, were given a width of 100 ft. At right angles to these streets and running in straight lines along the length of the island a series of avenues was laid out with a width of 100 ft. each and separated by blocks ranging from 650 to 920 ft. in length. The assumption that the principal traffic would be from river to river may have been a natural one when this plan was made, but it is found to have been a serious and costly blunder. Yet this plan has admirers who point to the dignity and character of the long straight avenues of Manhattan Island. Mr. Simeon Strunsky, in paying his tribute of admiration to Fifth avenue and incidentally to the general street plan of this part of New York, says:

"I know that this will seem very crude to the æsthetic snobs who are always deploring the checker-board plan of Manhattan Island, with avenues that run up and down and streets that sprint from river to river. They call the pattern monotonous because they see it only on the map. . . . Criticism of our gridiron city is only a way people have of echoing the English, who like to have their streets like their education bills and franchise

village street to form a beginning, and an exceedingly interesting plan has been worked out which appears to take advantage of the natural features of the site. (Pl. 15 and Pl. 18, p. 132.)

Industrial cities, such as Gary, Indiana, established by the United States Steel Corporation, or garden cities, such as Letchworth, have occasionally been planned and built on entirely new sites, but the city planner usually finds that the beginning has already been made, a beginning which may prove a serious handicap or may, though less frequently, be an admirable nucleus for the larger plan. While in planning for the future growth of an already existing city there is a natural and commendable desire to preserve everything that is old, picturesque and of historic interest, to do so will frequently result in obstructing a free movement of the business and traffic of the city. Few cities are fortunate enough to have had as their starting point a New England village green of generous proportions with a few wide highways radiating from it, or even to have had the beginning of a town plan like those of Buffalo and Detroit. Some of the cities of Continental Europe are built about an ancient chateau or schloss, the home of a prince who, after tiring of war, has devoted his energies to the laying out of a city of which the royal residence should be the center, and the result has been such a town as Karlsruhe, or Mannheim. In the former of these cities the fine radial streets were probably laid out for the purpose of providing dignified vistas of the castle or government buildings, or even for the purpose of defense against attack, rather than to facilitate free movement of traffic, but they have admirably performed both these functions. Again, the city may have been built about or under the shadow of the baronial castle, with little other purpose than to be near it and under its protection, as in the case of Edinburgh or Nuremberg. Most old cities have simply grown with very little planning. Comprehensive plans, where such have been prepared, are of comparatively recent date and have had to adapt themselves as well as might be to the older portions of the towns as they were, and make designs for sections not yet

laws—never going straight at anything, but full of kinks and knots and *cul de sacs*. . . . What I meant to say was that the city fathers, when they endowed us with our geometrical streets and avenues, were wiser than their modern critics, because they built according to their material and their needs. They had on their hands an island constructed by the original Architect something on the model of Abraham Lincoln. They accordingly fitted the island with a suit of democratic clothes, built for use and comfort instead of cluttering it up with periwig circles and diagonal avenue sashes and frilled terraces. They recognized that the shortest way from the tip to the root of this tongue of land we call Manhattan was by straight lines. So they acted not only in conformity with the material at hand, but with the national spirit, which cuts straight across things. And because they were faithful to their material and their native spirit they were better artists than the man who would have us tack from Park Row to Harlem because that's the way it's done in London and Florence."¹

These may have been some of the considerations that induced the commission of 1807 to work out their plan as they did. The reference to those "who would have us tack from Park Row to Harlem" is scarcely a happy one, as that is precisely what we have to do now between these and other points unless both our start and finish happen to be on or near one of the main avenues. The recent growth of New York has far exceeded the wildest dreams of those who made its first plan, and instead of being chiefly confined to Manhattan Island, it has extended over Long Island, the portion of which now within the limits of the Greater City had on July 1, 1914, a population of 2,173,582, as estimated by the Federal Census Bureau. The East River, which doubtless seemed to the early city planners an insuperable barrier to the further extension of the city in that direction, has been practically eliminated by the construction of four great bridges over it and eight railway tracks in tunnel beneath it, while another great railway bridge and four more tunnels are under contract, and two other tunnels are contemplated. Six tracks have also been carried under the Hudson River to the adjoining State of New Jersey.

While the expansion to the east and west may appear to have justified the early belief that the principal traffic would

¹ *Harper's Magazine*, September, 1915.

be across Manhattan Island, the growth northwardly has been equally great, and the few avenues are so overtaxed that, notwithstanding the fact that transit lines have been built over four of them on elevated structures and under some of them in tunnel, the need of additional thoroughfares in this direction is quite apparent, and the almost entire absence of diagonal or radial highways prevents direct access from one side to the other side at points above or below. (See Fig. 10.)

The plan submitted in 1811 extended as far north as 155th street, the area above that street not having been included, and in commenting upon this fact the commission said: "To some it may be a matter of surprise that the whole island has not been laid out as a city. To others it may be a subject of merriment that the commissioners have provided space for a greater population than is collected on any spot this side of China. They have in this respect been governed by the shape of the ground. It is not improbable that considerable numbers may be collected at Haerlem before the high hills to the southwestward of it shall be built upon as a city, and it is improbable that for centuries to come the grounds north of Haerlem Flat will be covered with houses. To have come short of the extent laid out might, therefore, have defeated just expectations, and to have gone further might have furnished material to the pernicious spirit of speculation."

The plan of New York is an excellent illustration of the lack of appreciation on the part even of men of high intelligence and ability, as were the members of the commission whose report has been quoted from of the great value of a system of radial or diagonal streets affording easy and direct connections between different parts of the city. The l'Enfant plan for Washington had been made some years before this commission undertook its work, but they probably deemed that more or less fanciful, or at least as better adapted to the great national capital than to a commercial city such as New York. Yet about a century and a half earlier, after the great fire of London in 1666, both Sir Christopher Wren and Sir John Evelyn made what are said

to have been simultaneous and entirely independent suggestions for the replanning of the streets of the burned district. These

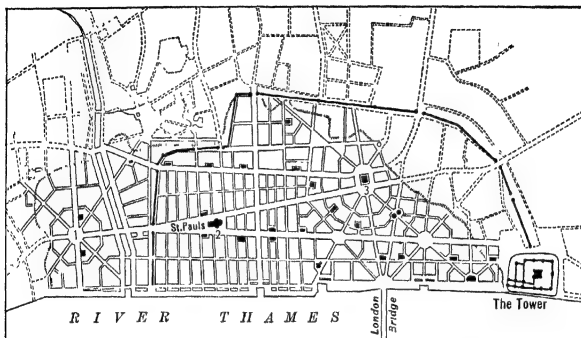


FIG. 14.—Plan proposed by Sir Christopher Wren for the rebuilding of the central part of London after the Great Fire of 1666.

plans, the chief features of which are shown in Figs. 14 and 15, afford a striking example of the agreement of those who have

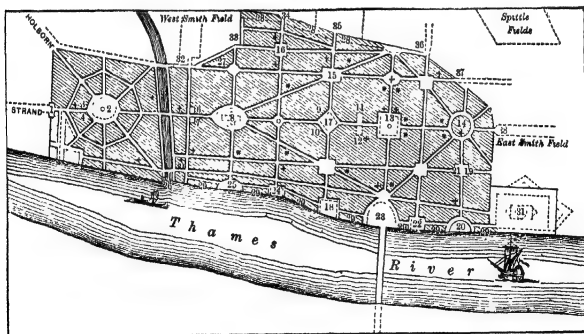


FIG. 15.—Plan proposed by Sir John Evelyn for the rebuilding of part of London.

given careful study to the subject upon the fundamental principles which should govern the planning of even the intensively

developed portions of a great city. In these two plans we are at once struck with the identical arrangement of the focal point where the Strand becomes Fleet street, from which eight main arteries radiate, one leading directly up to Wren's great cathedral, another to the financial center at the Bank of England, the Royal Exchange and the Mansion House, and another to the north end of London Bridge. Evelyn's plan continued the first of these proposed arteries eastwardly beyond Saint Paul's, affording an admirable view of this great structure and its splendid dome from the east as well as from the west. Again, at the north end of London Bridge, we see in both plans almost exactly the same arrangement of radiating streets and closely similar systems having their center at the bank. Although the suggestions were not carried out, the sanitary condition of this part of London appears to have been greatly improved after the rebuilding, as is indicated by a letter written by Professor John Woodward to Sir Christopher Wren some years after the fire, which is quoted by Mr. Elmes in his biography of Wren, and in which Professor Woodward says: "However disastrous it might have been to the then inhabitants, it proved infinitely beneficial to their posterity. . . . By the means of the common sewers and other like contrivances such provision was made for sweetness, cleanness and salubrity that it is not only the finest and pleasantest, but the most healthy city in the world."¹ Wren presented his plan for the rebuilding of London to the King and Council, and Mr. Elmes says that the Royal Society took umbrage at this, claiming that the plan should have "been previously submitted to them for review and approbation so as to have given the society a name." When the matter came before Parliament three policies were urged by different groups. "One was for an entire new arrangement as proposed by Wren, another for rebuilding it as before, but with brick, and the other for a combination of the two by building a quay along the river, widening some of the

¹ "Sir Christopher Wren and His Times," by James Elmes, London, 1852, page 233.

streets and rebuilding others, on the old foundations and vaults, with brick." The manner in which Wren undertook his task and the controlling considerations which guided him in the preparation of the plan are given by Mr. Elmes as follows: "In order, therefore, to a proper reformation Dr. Wren pursuant to the Royal Command immediately after the fire took an exact survey of the whole area and confines of the burning, having traced with great trouble and hazard the great plain of ashes and ruins, and designed a plan or model of a new city in which the deformities and inconveniences of the old Town were remedied by enlarging the streets and lands, and carrying them as near parallel to one another as might be: avoiding if compatible with greater conveniences, all acute angles, by seating all the parochial churches conspicuous and insular, by forming the most public places into large piazzas the centers of eight ways; by uniting the Halls of twelve chief Companies into one regular space annexed to the Guildhall; by making a commodious Quay on the whole bank of the river from Blackfriars to the Tower. Moreover, in contriving the general plan the following particulars were chiefly considered and proposed:

"The streets to be of three magnitudes; the three principal leading straight through the city, and one or two cross streets to be at least 90 ft. wide; others 60 ft. and lanes about 30 ft., excluding all narrow, dark alleys without thoroughfares and courts. The Exchange to stand free in the middle of a piazza and be as it were the nave or center of the town, from whence the 60 ft. streets as so many ways should proceed to all principal parts of the city; the building to be contrived after the form of the Roman Forum with double porticoes. Many streets also to radiate upon the bridge. The streets of the first and second magnitude to be carried on as straight as possible and to center in four or five piazzas."

Special emphasis should be placed upon the fundamental importance of such an arrangement of focal points and direct connections between them, and the fact that its advantages were fully realized by at least two capable men nearly two

and a half centuries ago, although the public authorities failed to grasp their importance and take advantage of the suggestions, while more strangely still this lack of appreciation has continued to be quite general even to the present time, and the commission which prepared the plan of New York referred to these radial and circumferential streets as "supposed improvements." and dismissed them for the very practical but short-

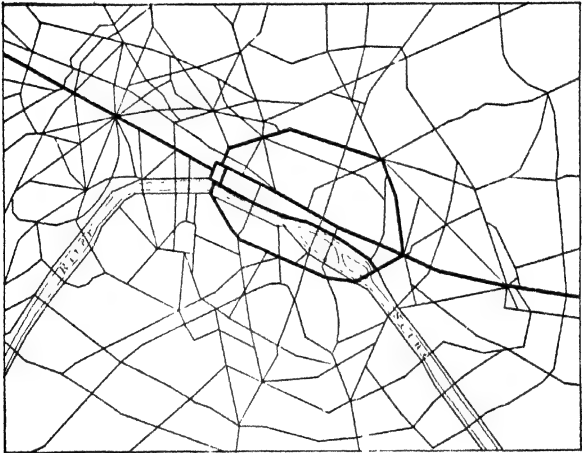


FIG. 16.—Plan showing the principal traffic streets of Paris. What might be called the major axis of the city and the inner system of boulevards are indicated by the heavy lines

sighted reason that "straight-sided and right-angle houses are the most cheap to build and the most convenient to live in."

In the replanning and reconstruction of Paris under Haussmann, this insistence upon some great focal points, with a system of thoroughfares radiating from them, the foci being connected by direct lines of special emphasis, and a system of circumferential streets, is seen to be the dominant feature. (Fig. 16.) In many Continental cities a study of the ground plan will show this same arrangement, in some cases symmetrical and clearly

defined, in others somewhat less obvious. It is especially apparent in Cologne (Fig. 17), in Moscow and in Vienna. The advantages are now quite generally appreciated, and the cities possessing these ring streets and radials have often been credited with more wise foresight than they have actually shown.

For generations, and even for centuries, the older parts have been hemmed in by fortifications which were deemed essential to their safety. Within the walls there was a maze of

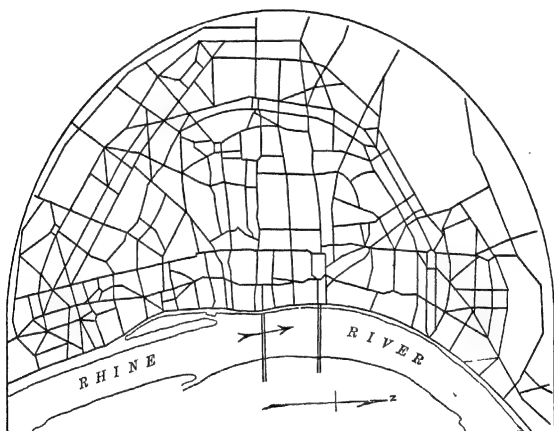


FIG. 17.—Plan showing the general street system of the central part of Cologne.
Both radial and circumferential streets are well defined.

narrow and frequently squalid streets. Congestion was extreme and the sanitary conditions were deplorable. A few highways led out of the cities through the walls and into the open country beyond, but these were not designed as arteries of traffic required by and contributing to peaceful commerce; they were rather routes of advance against or retreat before attacking forces, or were designed to facilitate predatory raids into the surrounding country. It was fortunate that when peace, rather than war, became a normal condition, and when the city walls could safely be demolished and the moats filled up,

the possibility of converting the spaces occupied by them into great ring streets or boulevards and their peculiar availability for this purpose became apparent. Here, then, was an area of publicly owned land, more than enough to provide a great encircling boulevard of generous width, with sites for important buildings which could advantageously be located along such a thoroughfare, with room even for open spaces and public gardens, and in addition, perhaps, land which could be sold at greatly enhanced value for sums which would go a long way toward meeting the cost of the physical improvement and of the public buildings. Such was the experience of Vienna, which glories in one of the finest, if not the very finest, ring street in the world, a street which Mr. Charles Mulford Robinson describes as "an enormous circular stage devised for the spectacularly scenic entrance and exit of the Viennese throng."

In the eighteenth century Vienna was a typical fortified town with walls, bastions, sallyports and moats. Behind these walls was a maze of narrow, crooked streets, with churches and market places occupying the only open spaces. Not until the middle of the nineteenth century did Vienna feel that it could dispense with its encircling fortifications, and an ambitious plan was evolved for the use of the space occupied by them. There were delays owing to a dispute between the imperial government, the state and the city as to the title to the land, but this was finally adjusted in 1857 and Vienna built its superb Ringstrasse, set aside sites for government and municipal buildings, museums of painting and sculpture, university and cathedral, and even then had a considerable area left for private development. Dr. Shaw says that about \$80,000,000 was received through the sale of the surplus land.¹ There was also an outer line of fortifications which are being similarly availed of for the creation of an outer ring, which, like the inner, will extend from the Danube to the Danube. While this may not be considered far-sighted city planning, it affords an instance of the intelligent appreciation of an unusual opportunity which was promptly

¹ "Municipal Government in Continental Europe," by Albert Shaw, page 422.

and admirably availed of. It is unfair, however, to credit some of the ancient European cities with a capacity for planning these splendid streets, which are conspicuously lacking in most towns. Moscow has them, probably secured in somewhat the same manner as Vienna secured hers; Cologne has replaced her ancient walls by a ring street, but Berlin has failed to take advantage of a similar opportunity. Such streets have from time to time been planned for American cities, but most of the plans have thus far failed of realization. The old walls of Paris are still available as a site for an encircling boulevard, and although this city now has a very complete inner and outer ring entirely surrounding the older parts of the city, a third boulevard is to be constructed along the old walls. But few towns have old walls which they can convert into ring streets, yet the advantages of such streets are so obvious that they are being planned by many of the great cities, some of them at enormous cost for land and buildings, which must be destroyed, with entire disarrangement of the connecting streets. Chicago has planned such a great boulevard on a most ambitious scale, the cost of which will involve many millions of dollars, and which has been more particularly referred to in Chapter III. Liverpool has in a less spectacular fashion, but in a far-sighted way, gone about the creation of such a street, which will permit traffic not destined for the central part of the town to pass entirely around it and avoid the most congested areas. The plans for this invaluable thoroughfare have been worked out by City Engineer Brodie, and one section after another has been acquired and constructed until Liverpool found itself in possession of this improvement almost before the general public was aware that it was in progress. Brussels has laid out and is gradually improving a similar great boulevard, the easterly portion of which, traversing the most highly improved part of the city, is one of the finest streets in Europe. American cities are making plans for such thoroughfares either by laying them out across the existing street systems or by coupling up fragments, widening here and extending there, to create the desired ring.

In the United States the gridiron plan has been tenaciously adhered to, though efforts have been made to break away from it. Rochester, New York, for instance, has provided quite a fair system of direct thoroughfares connecting different parts of the city. (Fig. 18.) After a destructive fire in Detroit, in 1805, a plan was prepared for the city which shows the influ-

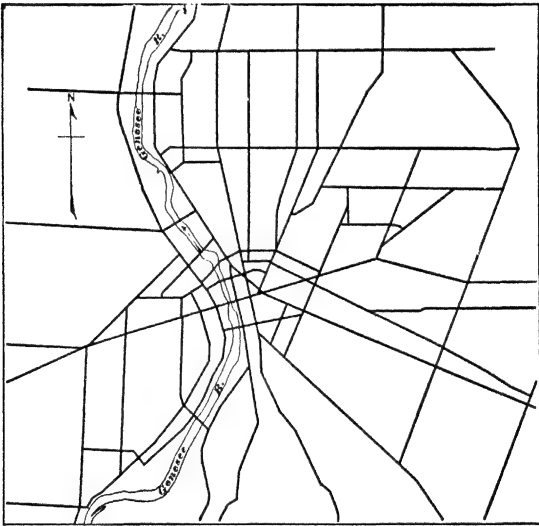


FIG. 18--Showing the principal through traffic streets of Rochester, N. Y.

ence of the Washington plan (Fig. 19), but the present street system of the city, the general features of which are indicated by Fig. 20, shows that it was not followed.

In every city there are large areas, not yet developed and not even planned, where opportunities are presented to design a street system, the different parts of which will be properly related to each other and to such modification of the system of the existing town as may ultimately be carried into effect. Too

often these undeveloped sections are planned as if they were so many different urban areas unrelated to each other or to the original city, and too often the obvious blunders of the older sections are repeated in the new additions. Too often, also,

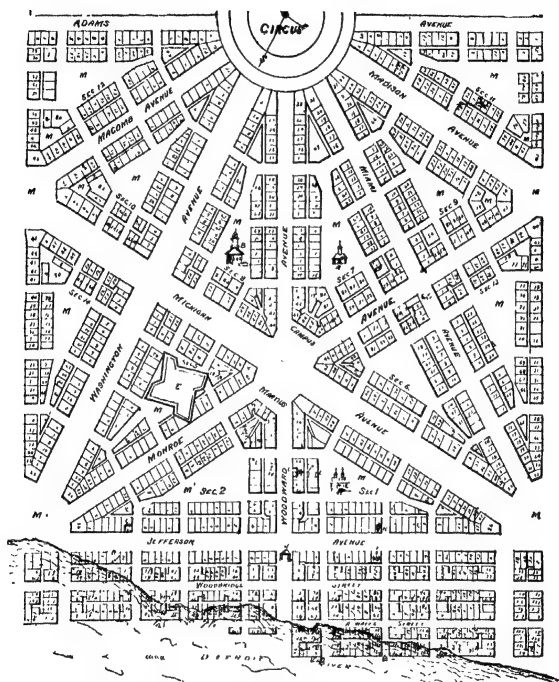


FIG. 19.—Plan proposed in 1807 for the City of Detroit, which had suffered from a destructive fire two years before. Reproduced from "The Building of Detroit," by C. M. Burton.

small fragments of these areas are laid out by owners or by land speculators who have acquired adjacent holdings and whose only aim is to divide them into as many building lots as possible and dispose of them promptly, leaving the new owners to suffer the annoyance and loss incident to a later readjustment of

street lines. Municipal authorities, especially in America, have been strangely indifferent to this practice, while their excuse often is that they have not the authority to control such operations, and this is frequently the case, the laws being framed to protect the land owner in his so-called right to do what he pleases with his property, rather than to protect the public, which is the city, against the unwise exercise of such right.

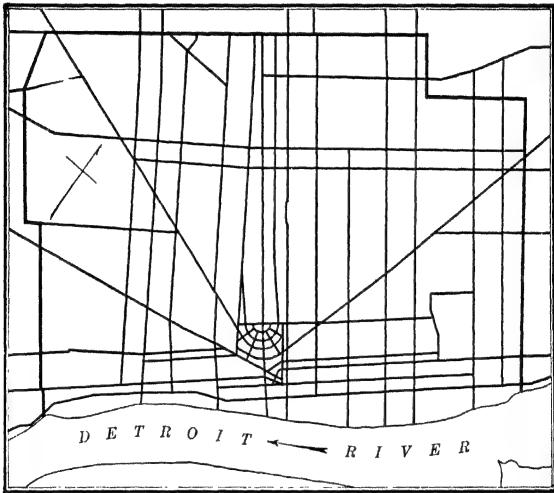


FIG. 20.—Plan showing the principal through traffic streets of Detroit.

While a city cannot often be planned from the beginning, there are certain general principles which should be regarded in the laying out of the street system of a portion of a town, as well as that of a complete city. These considerations were outlined in a paper presented by Mr. Raymond Unwin at the London Town Planning Conference in 1910 in the following words:

Having settled the purpose of the different areas, determined the general character of growth and the approximate direction desirable for main and subsidiary highways, the town planner finds himself with the following component parts out of which to make his design, namely:

The main center-point, or climax, dominating the whole; the secondary centers in definite proportion and relation to it; and the main highways linking them up; the whole giving the bones or main framework of the design.

Within the space defined by this framework, having special relation to the secondary centers and proportion to the primary highways, we have the network of secondary highways; while within the areas which these leave, for the purpose almost solely of giving access to the buildings, we have the minor roadways or drives, which should be in relation to any subsidiary center-point, and both in relation and proportion to the framework of secondary highways. . . . No system cuts up the land into more awkward corners or more thoroughly destroys the street façades, than that which consists of a framework of diagonal highways laid upon a rigid grid-iron system of minor roads, and from no system do such unsatisfactory road junctions result. In town planning it is essential to avoid being carried away by the mere pattern of lines on paper. Order, definiteness of design there must be, but there must first be grasped an understanding of the points where order is important and will tell, and of those where it matters little.

An excellent illustration of the result of superimposing a system of diagonal highways upon a gridiron plan of minor streets is presented in Washington. Large areas are left at the street intersections. Irregular plots are formed which would be the despair of the real estate developer or of a town which is obliged to finance its street improvements in the ordinary way. Washington, however, is the national capital of a rich republic and has behind it what is even better than an imperial treasury, namely, the generous pride of a people and a legislature, the members of which, while representing different States and local constituencies, delight in seeing their capital city become one of the most beautiful in the world. Washington was planned on a large scale, the public buildings have great open spaces about them, the streets are very wide and are well planted with trees. The circles, squares and other open spaces at the intersections of streets and avenues are used as sites for monuments, statues and fountains, so that these generous open spaces are in scale with the rest of the city. But Washington is an exception which proves the soundness of the general rule enunciated by Mr. Unwin. Such a plan would be so extrava-

gant as to be beyond the reach of the ordinary city, and is only possible in the case of one like the American capital, where the entire urban life is closely related to the government and where manufacturing and commerce, other than that incidental to the accommodation of more than 350,000 people, are almost unknown.

In nearly all cases where a street plan is to be devised, whether it be for a large area which can be treated almost as an entire city in itself, or for a smaller tract contiguous to the built-up portion of an important city, two controlling conditions must first be taken into account—the topography and the existing roads. An accurate topographic survey of the entire territory will be of great value, but the first step should be a determination of the lines of main drainage and the selection of routes for main arteries of travel which will give favorable grades, and only the principal topographical features need be shown. This should not be understood as indicating a lack of appreciation of the value of a thoroughly good topographical map. The information obtained should be accurate so far as it goes, but it is unwise to go too far at this time. More complete topography will be needed when the minor details of the plan are worked out, but the time and expense of securing it can well be deferred for the present. Many street plans have been made which are very attractive on paper but which are found to be entirely impracticable when transferred to the ground. Had a sufficient topographic survey first been made, such impossible plans would not have been proposed. The next essential is an accurate plan of the existing roads, showing their widths and the buildings fronting upon them. These roads will be of two kinds—the old highways which serve to connect villages or centers of population, some within and others without the area to be platted, and roads or streets which may have been laid out as parts of real estate developments and according to which property may have been sold, but along the lines of which there has been little or no building. The former class of roads have an excuse for their existence and they serve a useful pur-

pose. They lead where people want to go and are likely to be fairly direct. Their alignment may be somewhat faulty, their grades may be excessive in some places, and their widths will be inadequate in view of the fact that they will naturally become the main lines of traffic for the urban district which will include them. With such straightening and widening as may be deemed necessary and such changes in line as will reduce excessive grades, those old roads will be the logical basis of the street plan which is to be prepared. (Fig. 21.) When they have been platted it will be obvious that additional roads will be needed, some to

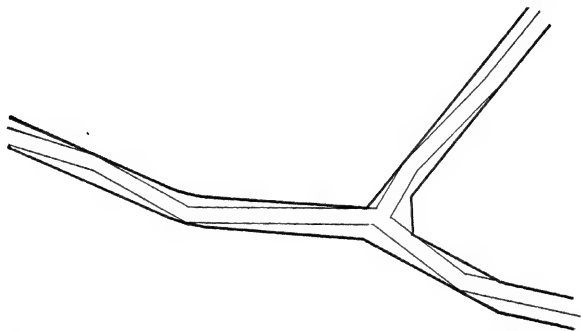


FIG. 21.—Showing how a narrow and crooked road can be included within the lines of a street of moderate width without leaving strips covered by public easements between the street lines and the abutting property.

establish cross connections, others to give greater directness to the roads traversing the entire territory, others as by-passes around groups of buildings so located as to render the widening of some portions of the old roads unduly expensive, and still others to furnish lines of main drainage along the valleys through which the lateral sewers and subsidiary trunks must ultimately find their outlets. This system will be "the bones or main framework of the design" referred to by Mr. Unwin. There will probably be no main center or climax and no secondary centers to be connected at this time. If they already existed there would also be a system of streets which would have to be

reckoned with and which would make the problem one of replanning, and such problems of replanning are those to which most writers on this subject are inclined to confine themselves. A careful examination of existing roads either in outlying districts or in the central parts of a city will frequently show how readily a system of radial and circumferential highways can be created by filling in a few gaps and cutting through new streets

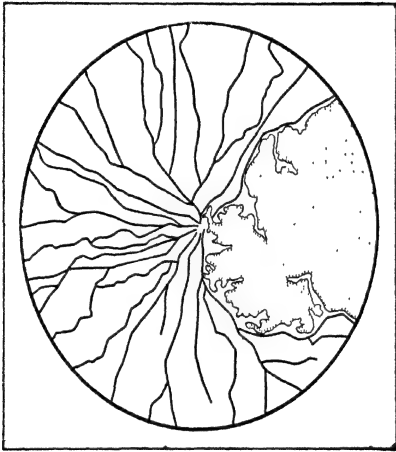


FIG. 22.—Showing existing radial thoroughfares of Boston. This and Fig. 23 are reproduced from the Report of the Metropolitan Improvement Commission, 1909.

for short distances. This is illustrated by the diagrams included in the report of the Metropolitan Improvement Commission of Boston on public improvements for the metropolitan district which was published in 1909, and, while these diagrams have frequently been reproduced, they so aptly illustrate the point that they have been inserted as Figs. 22 and 23.

We are considering now the planning of undeveloped territory in such a manner as to make replanning unnecessary. While no one can predict with any certainty the precise manner

in which any city will grow, the purpose of the preliminary and initial design which has been outlined is to establish lines of least resistance which future development will be quite likely to follow. Thus far we have considered only the roads which will probably become the main arteries of traffic and that will lead with reasonable directness where people will wish to go. These roads may divide the territory into a series of irregular figures having three, four or more sides, which sides may be a

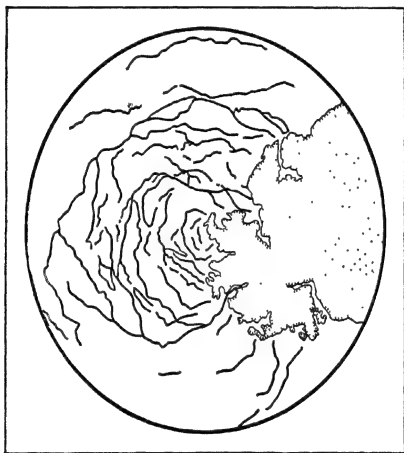


FIG. 23.—Showing the fragments of circumferential thoroughfares of Boston.

quarter or a half a mile, or even more, in length. These areas must be subdivided by secondary roads, in the location of which regard should be paid wherever possible to property subdivisions, to the possibility of some of them developing into main traffic roads and to the avoidance of awkward junctions with the main roads already laid down, which would result in confusion of traffic (Fig. 24). It is difficult to say how wide the primary and secondary roads should be made. The Royal Commission on London Traffic in its report, made some years ago, after an exhaustive study, suggested the following widths for princi-

al streets: main avenues 140 ft., first-class arterial streets 100 ft., second-class arterial streets 80 ft., third-class streets 60 ft., fourth-class streets 40 to 60 ft. This scale of widths may be somewhat over-generous and might involve unnecessarily great cost, but that such a commission should have proposed them shows that its members were profoundly impressed with the handicap under which London has suffered by reason of its

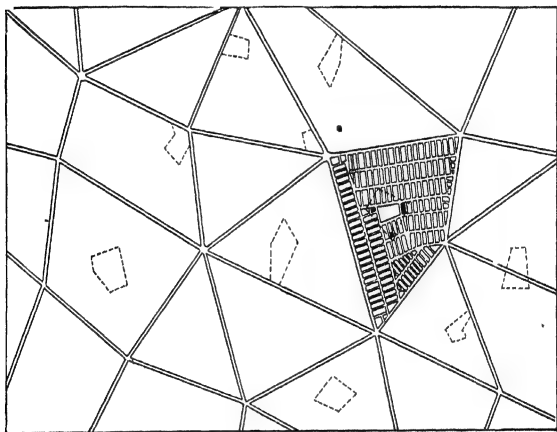


FIG. 24.—Typical plan showing the development of an arterial street system, making use of existing roads with additional connections, and the acquisition of acreage property for small parks, sites for public buildings, etc. (p. 141).

inadequate highways. As early as 1875 a Prussian law relating to the streets of Berlin provided that the main streets should be 95 ft. or more in width, secondary thoroughfares from 65 to 95 ft., and local streets from 40 to 65 ft. Another standard was set for secondary German cities, which prescribed 85 to 120 ft. as the width of main thoroughfares, 50 to 80 ft. for secondary thoroughfares, and 35 to 48 ft. for local streets.¹ In laying out the secondary roads, as in the case of main highways, considera-

¹ "Modern City Planning and Maintenance," by Frank Koester, page 58.

tion should be paid to the topography although, perhaps, to a somewhat less degree, grades and directness being of less importance, although provision for surface drainage and sewers should always be borne in mind. Lastly will come the minor streets, which will serve almost entirely for access to dwellings. As all of these streets will connect directly with either the secondary or main highways, their alignment and grades are of little importance, as they will be used almost exclusively by private vehicles or those delivering supplies to the abutting houses. The chief concern is that they should be so laid out as to furnish ample light and air and discourage, if not prevent, a too intensive development, with rear buildings in case the city ordinances do not prohibit this menace to health and decent living. To plan far in advance the precise location of these minor streets is not necessary, if it be not unwise. Considerable latitude can well be allowed the individual developer in their arrangement, provided always that his plans are submitted to the proper municipal authorities for their examination and approval before the development can proceed.

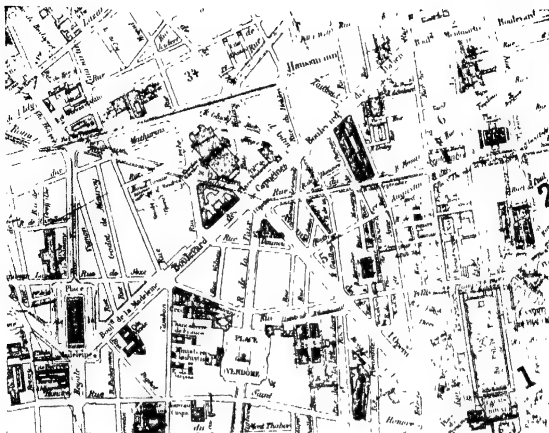
While the street system in the different small areas formed by the secondary streets may be similarly treated, the minor streets running directly across those of the secondary class, there is no special reason why this should be done. There is no reason why a street which is to be devoted to private residences should be long and straight. Among the most attractive features of a city are small residential areas treated in a distinctive way, each with a character of its own, which the visitor stumbles upon with agreeable surprise. If these minor subdivisions are planned at different times or by different persons, this variety in treatment is more likely to be realized. The important thing is that the diagonals or the main arteries be planned first, and that leading off from them will be highways of secondary importance, from which again will branch the smaller and less important streets. As pointed out by Mr. Unwin, the development of a street system is somewhat analogous to the growth of a tree; first, the trunk, then the main branches, the

minor branches and the twigs, but the small branches and the twigs do not grow directly out of the main trunk. Connections between the secondary or minor streets and the main arteries of traffic should not be too frequent or they will interfere with ease of movement. The idea that subsidiary streets should be connected with important thoroughfares at frequent intervals is a mistake. Not only is a large portion of valuable frontage taken by these openings, but traffic movement is embarrassed. Whenever a system of diagonal streets is superimposed upon a rectangular plan, the awkwardness of acute intersections with important diagonals is apparent. It would be better if connections with important thoroughfares were made as nearly at right angles to them as possible, preserving thereby more desirable sites for important buildings on such streets.

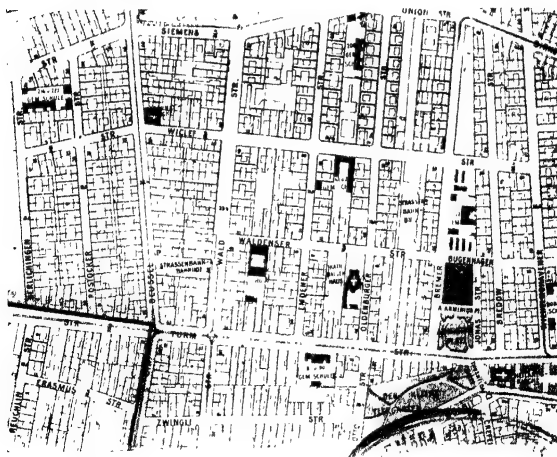
Some special developments may already have been planned before the main and secondary street systems have been established, and these, provided they have been laid out with reasonable skill and with due regard for sanitary conditions, usually can be incorporated into the final plan. This does not mean that such developments should be permitted without previous approval by the authorities having jurisdiction over the city plan. The need of absolute control of them cannot be too strongly insisted upon, but in most American cities there is no provision for such control, and they may have been laid out before the area in which they are located became a part of the city. Many or most of the lots may have been sold to innocent purchasers, and to ignore them or to lay out a new system of streets without regard for them would impose upon the new owners a real hardship and an expense which might be serious, while the original developer is likely to have "unloaded" and to have put himself beyond the reach of punishment for his disregard of the public interest, if there shall have been such disregard. It may not be, however, that, because the plan which has been followed is not one that the engineer who is charged with the duty of planning the street system for the new area would himself have followed, it is essentially bad and unsuited

for incorporation into the new plan. It might well answer for one of the minor subdivisions, yet there are many instances where layouts of this kind, even where the abutting lots have been built upon, have been utterly ignored and a new rectangular system has been imposed upon the area as if it were entirely undeveloped. The new plan may be carried out at great expense, or, years after its adoption, it may be found necessary to abandon it altogether and revert to the original layout, with awkward connections between the old and the new streets which might have been avoided had the original development been recognized in the first place and incorporated into the street system, which in many cases would actually have been improved by a variation from the gridiron plan which so generally prevails.

While directness is desirable in the main and even the secondary streets, it does not follow that such streets should be perfectly straight; in fact, straight streets are seldom interesting. Neither need circumferential or curved streets be laid out with perfect symmetry. The great boulevards of Paris consist of a series of chords of varying length, with deflections at different angles, yet their pleasing effect is in no wise diminished. Symmetry on a plan and symmetry on the ground are very different things. In studying a plan the slightest departure from such symmetry is noticeable, yet on the ground it cannot be detected. One can ride or walk along a boulevard following a sweeping curve and be unconscious of the fact that its radius is frequently changing, while if examined on a plan these changes are at once apparent. Even if such a boulevard were broken into short straight sections, the utility of the street and even its beauty, so long as its general direction is preserved, are practically as great as though its lines were perfectly straight or symmetrical, and it undoubtedly acquires added interest from the fact that important buildings located at the points where the direction is changed will show to excellent advantage and attractive pictures may thus be formed. Such frequent changes in direction are conspicuous features of the plan of



A small section of the plan of Paris showing the irregular yet symmetrical arrangement of streets and boulevards affording admirable sites for monumental buildings (p. 111)



Plan showing the over-intrusive use of land by the erection of rear dwellings in Charlotte (pp. 42 and 122).



Examples of curved streets. The two upper views show the introduction of abrupt curves without apparent reason. The moderate curvature in the lower view is justified by the topography.

CONNEMARA POLICE
8 - JAN 1934

Paris. (Pl. 16.) The difference between the actual street and the plan has already been pointed out. Emphasis should be laid upon the fact, however, that it is the street itself and the buildings on either side of it that the people see, and irregularity or lack of symmetry which may distress a draftsman will never be noticed on the ground.

In the minor streets within the smaller subdivisions, while there is no special reason for making them straight or even direct, the deliberate introduction of deflections or irregularities or "mere aimless wiggles," as Mr. Unwin calls them, may seem forced and irrational. (Pl. 17.) In recent city planning in Germany there is a marked disposition to introduce deflections or even offsets in streets at frequent intervals, sometimes of one or two blocks, for the express purpose of creating interesting street pictures. On strictly local and unimportant residential streets such obstacles to the free movement of vehicles may be of little moment, while the streets undoubtedly acquire additional interest by this treatment. If an unexpected amount of traffic should develop along these streets the inconvenience caused by these offsets would be very great and would be an excessive price to pay for the street pictures. Several methods of securing the desired effects and at the same time avoiding embarrassment to street traffic are shown in Fig. 25 (p. 112), such treatment being frequently adopted in German cities.

Perhaps no city to which modern planning has been consistently applied affords a better example of studied irregularity in its street system than Essen, located in the largest coal mining and industrial district of Germany. (Fig. 26, p. 113.) The old portion of the town lies north of the railroad, which traverses the city from east to west, and from the old center there is an excellent system of radiating traffic streets, while several ring streets encircle it. In the newer part of the city lying south of the railroad the irregularity of the minor street system is as conspicuous as in the older town, yet these streets have been carefully planned by Dr. R. Schmidt, the chief engineering

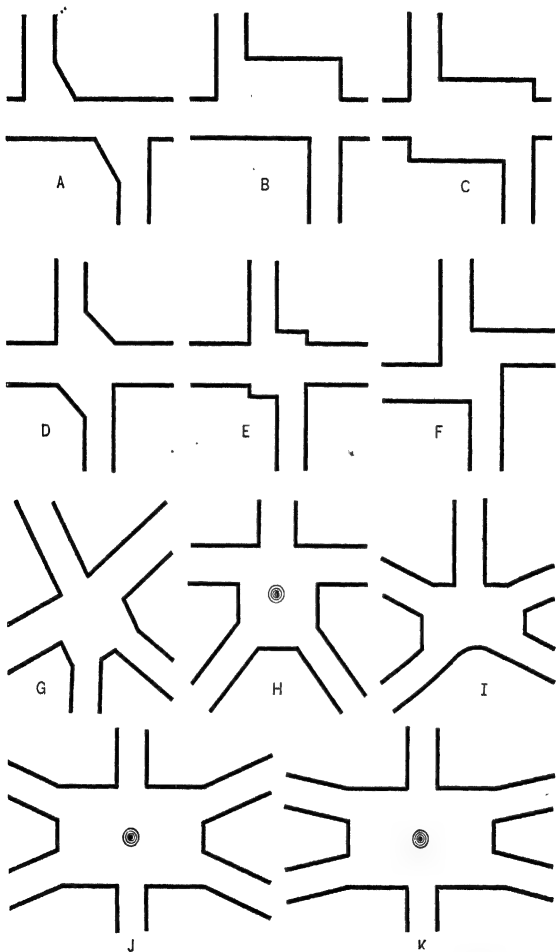


FIG. 25.—Showing different methods of treating offsets or irregular street junctions by slight enlargement of the open spaces.

official of the city. Mr. Harold M. Lewis in an article on the planning of Essen which appeared in the *Engineering News* of August 20, 1914, says that: "The streets at first seem to be hopelessly tangled and crooked, but as soon as this arrange-



FIG. 26.—General plan of Essen, showing the studied irregularity of the street system.

ment is studied it becomes apparent that this is a carefully planned disorder. . . . The aim of the planner was to furnish throughout the city constantly new and varied vistas not only in respect to the houses and their relation to the streets, but also to the width and arrangement of the individual streets.

The completeness with which this plan has been carried out is shown by the fact that the range of vision in the streets is as a rule limited to 650 to 1000 feet." Further comments on the treatment of individual streets of Essen will be found in the Chapter on Street Details.

Many writers on city planning are enthusiastic over the picturesque attractiveness of the mediæval Gothic towns of Germany, and they draw freely upon them for their illustrations. Perhaps there is a disposition to credit the planners of these towns, if they were planned in the modern sense, with a more serious intention to produce these effects than they are entitled to. The adaptation of the street plans to a rugged topography has resulted in some very charming street pictures, the origin of which is attributed to a finer sense of arrangement than is shown by modern town planners, while it may be due in large measure, perhaps wholly, to a rational use of rugged sites for the buildings first required—castle, church, watch-tower, etc.—and then, as the towns grew, to the fortunate location of the streets leading to and connecting them. Town halls and guild houses were not required in the early history of these towns. The people did not make their own laws and had little use for legislative halls or for the machinery of government. Their overlords attended to these details for them, as well as to such planning of their towns as was deemed necessary. No one will deny the charms of these old cities, but they grew out of social conditions which are fortunately unknown to-day. Their locations, the placing of their buildings, the arrangement and dimensions of their streets, reflected these conditions, which are exceedingly interesting to us. Some of their features may be worthy of reproduction in the towns which we are building to-day, but extravagant praise of them, coupled with condemnation of the more practical but less romantic, though more livable, cities which have lately been developed, seems unwarranted.

The continuity of streets is important, but by continuity is not meant their prolongation indefinitely in straight lines,

but easy connections which will not be serious obstacles to traffic movement along the streets themselves or along those which they intersect or cross. In many private developments provision for such continuity is often overlooked and in some cases deliberately avoided. An instance is given by a British writer where two adjoining estates with areas of over 500 acres have been carefully laid out with the express purpose of preventing access from one to the other, and the by-laws were powerless to prevent this unwise action. At least one similar case has come to the notice of the author, where rival landscape architects engaged in planning the development of adjoining tracts deliberately located their roads in such a manner as to prevent direct communication.

In 1874 Mr. Samuel McElroy submitted to the Town Survey Commission of Kings County, N. Y., plans for street systems for the several towns of that county outside of what was then the City of Brooklyn. His report, which accompanies the plans, contains some excellent observations, but the emphasis which he lays upon the great desirability of continuous streets extended for long distances, whatever may be the probable character of the development of the abutting property, illustrates the passion for uniformity which has so generally prevailed in the United States. While noting "the tendency of prominent centers to connect themselves by straight lines, often diagonal to the intervening systems," he still deplors the fact that the development of the populated centers at certain villages did not "permit the adoption of any uniform system of streets and avenues strictly adapted to the form of Kings County," and that the plans must, therefore, adapt themselves to the local progress made. He lays down the general principle that streets and avenues should be so placed that "the blocks will range in lines parallel with those of greatest travel," and he therefore projected the street systems already existing in the different parts of Brooklyn as far as possible into the territory to be mapped, and he described the resulting plan as giving "a broad, comprehensive and uniform system

of streets running toward the ocean or the harbor carefully connected with the city streets and avenues and located without regard to farm lines or individual interests." There were certain points of interest which it might be assumed would

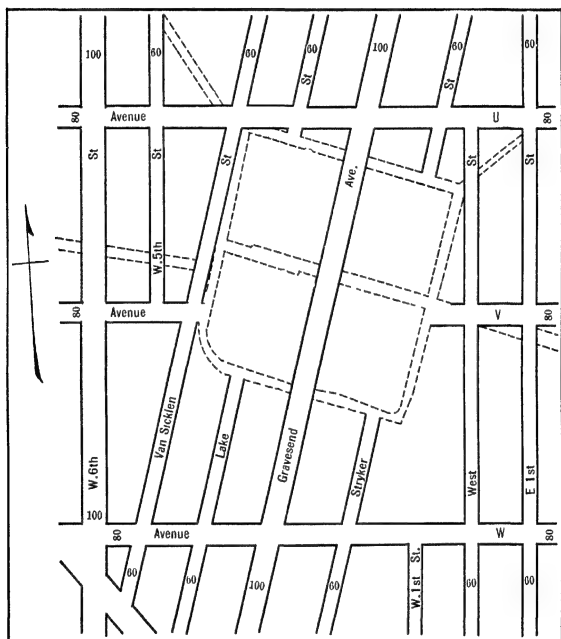


FIG. 27.—Plan showing the manner in which an old established center was ignored in developing the street plan of Brooklyn, N. Y.

have been preserved and emphasized in a plan prepared at this time; for instance, there was the village square laid out by the first English settlers in Kings County in the seventeenth century. This would have made an admirable starting point for one of the subdivisions of the greater plan, yet it was entirely ignored, or at least it was not incorporated into the plan

(Fig. 27). An old road of great historic interest followed a course which would have made an excellent circumferential street, or even boulevard, but this also was ignored, although efforts are now being made to widen it and use it for the purpose for which it was so well fitted. The report further expresses

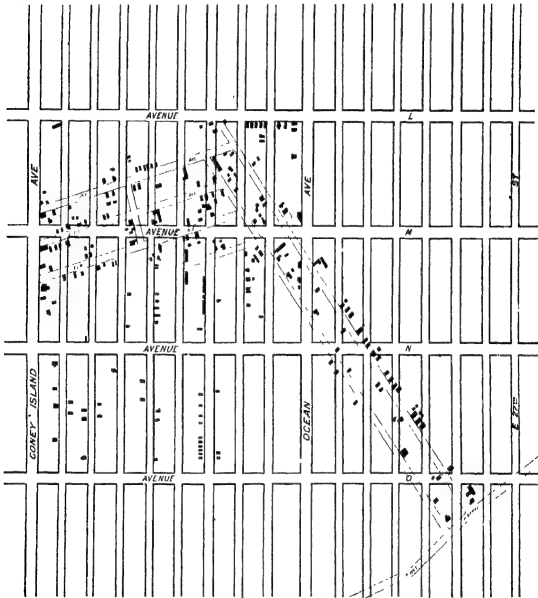


FIG. 28.—Showing the disregard of existing improvements in carrying a rectangular street system across old streets which could, without serious objection, have been incorporated in the plan

disapproval of the fact that the location of a part of the great boulevard laid out under the provisions of a special law was so changed that it "will cross our system diagonally when constructed and mutilate a general plan carefully studied." The unnecessary disregard in this plan of an existing development is shown by Fig. 28, yet forty years after Mr. McElroy's plan was

made some of the streets in this development are being restored for the reason that their elimination would involve such damage to improvements made along their lines that the cost was found to be prohibitive.

A consideration which has quite generally been lost sight of in the planning of cities is the orientation of the streets in such a manner as to insure a certain amount of direct sunlight for each building, particularly for each dwelling, on every day of the year. This subject has been discussed with special thoroughness by Mr. A. Augustin Rey, two of whose papers are well worthy of study.¹ Mr. Rey says:

The orientation of the public streets and the consequences that it entails dominate in reality the whole health of towns and dwellings.

How could it have been forgotten that a public street on which buildings were to be placed, whose importance would increase, could be created in no matter what direction, having no matter what width, and bordered by buildings whose height would be fixed by rules without rational basis, without foreseeing the disastrous consequences from a hygienic point of view arising from such negligences? The buildings covering, for example, the town of Paris, in the interior of the fortified enclosure, represent at the present time fifteen thousand millions of francs (three billion dollars). And no regulation whatever has concerned itself with the laws of light for an agglomeration of such colossal value.

When we traverse the most beautiful towns of Europe and America it is really amazing to observe to what point this law of light has been outrageously violated in all the laying out of their plans. By way of example for all towns of the world, we have concentrated our study on ten of the largest towns of Europe and of the United States of America. One can point out to a nicety the entire absence of any systematic rule having presided at the establishment of these plans. Only one city has been planned since its commencement with some sense—the American Capital, Washington. Its plan dates from 1790, and it is the work of Major l'Enfant, who, on the site assigned to him, mapped out in advance the seat of the future Capital which was to take the name of the great American citizen.

¹ Proceedings of the First International Congress of Cities held at Ghent, 1913. "La Ville Salubre de l'Avenir, Principes Scientifiques d'orientation des voies publiques et des habitations."—Also *Town Planning Review*, Vol. VI, page 2.

The amount of direct sunlight which will reach any building is obviously dependent upon the latitude of the locality, the direction and width of the street, and the height of the abutting buildings. Mr. Rey has computed the time of insolation for buildings of three different heights on streets running north and south, east and west, and at angles of 30 degrees and 45 degrees from the north and south line for ten large cities. The heights of buildings used are eight, fifteen and twenty-one meters, corresponding with two, four and six stories, and the cities are Moscow, Berlin, London, Paris, Vienna, Boston, Chicago, New York, Philadelphia and Washington, the latitude of the first being $55^{\circ} 45''$ and that of the last $38^{\circ} 53''$. He finds that to insure two hours of direct sunlight on the shortest day of the year a street in Moscow running east and west and lined with buildings 21 meters high would have to be 105 meters or 344 ft. wide, while in Washington a similar street with buildings of equal height would have three hours of direct sunlight if it were 42 meters or 138 ft. wide. On a north and south street in Moscow, with buildings only eight meters high, there would be one hour and five minutes of direct sunlight if the street were 12 meters or 39 ft. wide, while in Washington there would be one hour and forty-five minutes of such direct light if the street were but eight meters or 26 ft. wide. Similar computations have been made for each of the ten cities for each of the three heights of buildings, and for streets running in the four directions above named. The subject is worthy of far more careful study than has heretofore been given to it, but to provide the amount of sunshine which Mr. Rey advises would be impossible in many cases.

The *cul-de-sac* is a picturesque feature of old cities. It is apt to be unsanitary and inconvenient, and it constitutes an element of danger in case of fire. Every street should be provided either with a direct outlet or with ample space for turning vehicles at its closed end. Some writers on city planning have protested against the abolition of the *cul-de-sac*, and it must be granted that a quiet street with but a single outlet,

especially when provided with a court at its inner end, about which buildings can be grouped, and with room for some planting in the center, is a most attractive place for those who desire quiet homes. Such a subdivision of a large and irregular block

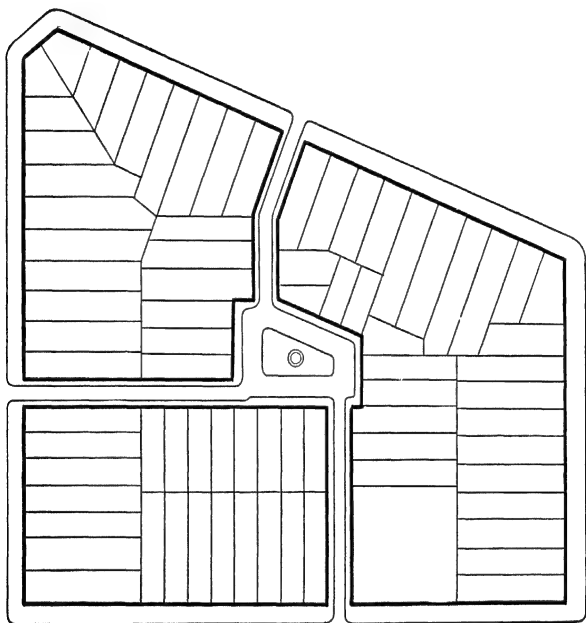


FIG. 29.—Plan showing the subdivision of an irregular block by the creation of an interior court with a small park and three outlets.

is shown by Fig. 29, although the court is provided with three outlets.

American cities are apt to provide more liberally for their street widths than are those of Europe, and to one familiar with the layout of the newer American cities it is interesting to note that the English town planners derive much satisfaction from what impresses them as the liberal provision recently made

for streets in certain communities in Great Britain. In one case satisfaction is expressed at the fact that the main lines of communication are made 60 ft. wide, the principal tributaries 50 ft. and streets of less importance 40 ft., while an effort was made to depart from the gridiron plan by providing crescents with open spaces, squares, gardens, etc. Another instance is noted where in an area of 27 acres, with a population of 6,500, the owner in rebuilding decided to co-operate with the authorities and substitute main avenues 60 ft. wide for streets which were formerly half that width.¹ Have not American cities in many instances gone too far in providing wide streets, or have they not, influenced, perhaps, by the recent passion for standardizing everything, lost sight of the great difference in the needs of traffic and business streets and those which will be devoted entirely to residences, in many of which the chief consideration is the provision of decent and sanitary homes at a minimum of expense for land and improvements? The oldest cities both in Europe and America nearly always suffer from a lack of wide streets, and the cost of supplying them is so great as to be almost prohibitive. Yet too wide streets may prove to be a serious handicap in that they are likely to result in solidly built blocks of tall tenements, the rents in which are unduly high owing to the fact that extravagant street improvements must be paid for by the property. Mr. Thomas Adams has expressed the opinion that the system of block dwellings found in Germany and Sweden are as much the result of too wide streets as the need of wide streets is the result of compactly built tenements. Dr. Werner Hegeman, of Berlin, also says that: "Berlin, with her 200,000 families in one-room dwellings, is suffering from too wide, too well paved, and too highly organized roads, and from the extensive high tenement houses that seem necessarily to result from too expensive roads carried into purely dwelling-house districts."² Instances of over building are frequently to be found in some of the much-admired German

¹ Proceedings of London Town Planning Conference, 1910, page 298.

² *Ibid.*, page 239.

cities, an example taken from Charlottenburg being shown by one of the illustrations on Pl. 16 (p. 110). While excessively wide streets may be provided in some cases, a lack of them is far more common. It is said that Paris has 102 miles of streets 98 ft. or more in width, while London has but $8\frac{1}{2}$ miles of streets of as great a width.

The size of the individual building plot, and consequently the size of the blocks, which are simply groups of plots, will be determined by the distance between the streets, or it might be more accurate to say that in the final subdivision into streets the customary size of the plots and the manner in which they are combined in blocks determines the distance between streets and to a certain degree their location. What, then, is the reasonable and economic size of building plot units? This size is likely to be determined by an established policy, which is a habit rather than the result of a study of the possibilities of economic development or its effect upon social conditions. In New York the standard plot is 20 or 25 ft. wide by 100 ft. in depth. The width varies in the different parts of the city, but the depth of 100 ft. is almost invariable. If an owner desires more than one lot, he buys several of these units, but the buildings, with very few exceptions, have frontages which are multiples of this standard lot width, and only in cases where they extend through the block from street to street is their depth more than 100 ft. or such proportional part of that depth as the building laws permit to be occupied. This lot depth prevails alike in commercial, manufacturing and residential districts, whether the last named be devoted to costly detached houses, to compactly built tenements, or to small houses designed for workmen or small salaried clerks. In any case the number of square feet to be acquired for each foot of frontage is the same, whether it is to be used by a great manufacturing or commercial concern, by a man of wealth for the erection of a fine mansion, or by the person of slender means who is obliged to borrow the money to provide a home and where the payment of interest on his mortgage taxes his resources to

the utmost. The price per front foot will, of course, vary with the character of the neighborhood and with the width of the street and the cost of its improvement; but when the street width, as well as the lot size, is rigidly standardized, the workman who desires a cheap home suffers a serious and unfair handicap. And it matters not whether he tries to own his own home or, as in most cases, rents one; the burden runs with the land, and if he does not pay in interest he pays in rent. The man of wealth can afford to pay for a large plot to accommodate his home. The poor man should have the opportunity to pay for as little land as will provide the home he wishes, with an insurance of sufficient light and air about it to make that home decent and healthful. A cottage 25 or 30 ft. in depth does not need a lot 100 ft. deep to accommodate it. Why, then, should not the builder of such a cottage, whether it be for occupancy or rent, be able to secure a lot of suitable size on which to place it? If the back-yard abutting against a similar back-yard on the next street were used as a garden, the case might be different; but, even where there is room for them, gardens are seldom made, and in most cases the reduction in the cost of the site would more than offset the value of the rear garden, especially where there is space for some planting in the front or where public gardens or small parks are provided in the neighborhood. With lots of less depth the street widths could also be less, assuming always that the ordinances are such as will prevent the intensive development of shallow lots with compactly built tenements four stories or more in height.

Figs. 30 and 31 show an area approximately triangular in shape between bounding streets 100 ft. and 80 ft. in width. Both are taken from a plan of one of the eastern cities of the United States. Fig. 30 shows the system of streets by which this area is subdivided and the manner in which each block is cut into building plots, the standard width of which is 40 ft. with a depth of 100 ft. These streets are simply a continuation of a rigid rectangular system which covers the entire territory

surrounding the particular area under consideration. The development contemplated is evidently one of detached houses for one or two families. Fig. 31 shows an alternative scheme of development using streets 50 ft. and 40 ft. in width with plots having frontages of 50 ft. and depths of 60 ft. The entire area between the bounding streets is 24.93 acres. Under the first

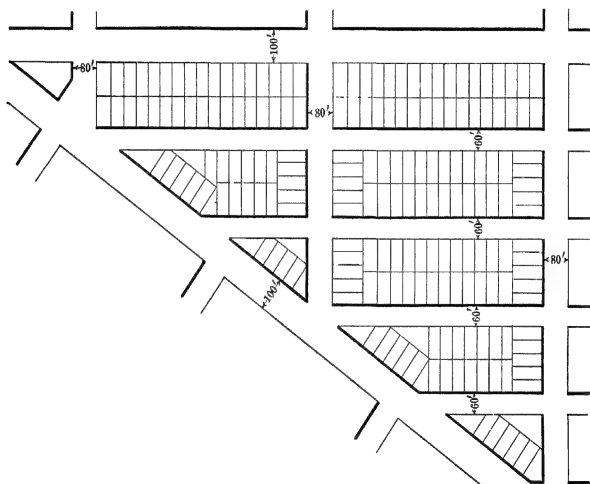


FIG. 30.—Plan showing a conventional method of subdividing a triangular area into blocks 200 by 700 ft. by streets 60 and 80 ft wide, resulting in acute intersections with the diagonal bounding street and providing building plots 40 ft. wide and 100 ft. deep.

plan 24 per cent of the area is devoted to streets and 76 per cent to lots; under the second plan 26 per cent is given up to streets and 74 per cent to lots, in the second plan, however, is included a small park slightly over half an acre in extent. For streets having widths of 60 and 80 ft. the standard roadways in the city under consideration are 30 ft. and 44 ft. respectively, with sidewalk pavements 5 ft. in width. In the alternative plan the streets 40 ft. and 50 ft. wide are assumed to have roadways of

16 ft. and 20 ft. respectively, while all sidewalk pavements are 4 ft. wide. In the second plan the amount of curbin., will be 58 per cent greater, of sidewalks 26 per cent greater, of sewers 97 per cent greater than under the first, but the area of pavement will be 26 per cent less.

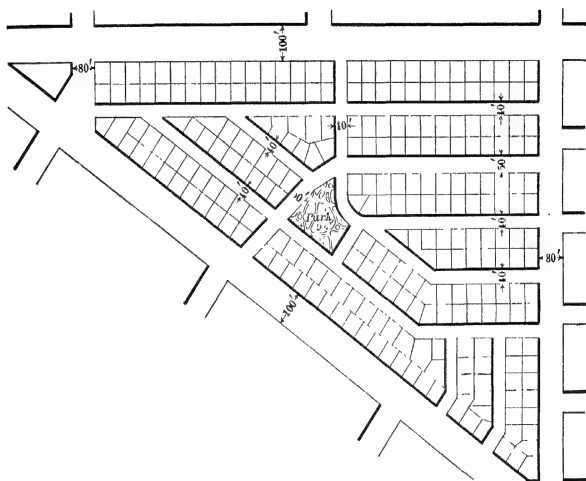


FIG. 31.—Plan showing an alternative subdivision of the same triangular area by streets 40 and 50 ft wide with better junctions with the diagonal bounding street, providing building plots 50 ft. wide and 60 ft. deep and a small neighborhood park.

The cost of the land is estimated to be \$3000 an acre and the tract to be so nearly level that the slight amount of grading required is included in the cost of the paving. The entire cost of development under the two plans is indicated by Table IV.

There is no more perplexing problem met in city planning than that of land subdivision, both into blocks and lots. Emphasis has already been placed upon the need of as much flexibility as possible in the street plan, in order to make it adaptable to changing conditions of use and occupancy. Nearly every

city affords numerous illustrations of such changes, residential districts of the better class having in time been converted into cheap tenements or into combined shops and flats, and these in turn having been displaced by warehouses and factories. At the City Planning Conference held in Detroit, in 1915, an excellent report upon this subject was presented by Mr. E. P. Goodrich, which was followed by a valuable discussion.¹ The changes which have taken place in a typical block in New York from 1853 to 1914 were illustrated by diagrams showing the proportions of the lots covered, and the nature of the occupancy in 1853, 1884, 1893, 1905 and 1914. The first and last of these are reproduced as Fig. 32.

TABLE IV

SHOWING THE RELATIVE COST OF DEVELOPMENT OF THE SAME AREA UNDER DIFFERENT METHODS OF SUBDIVISION, AS INDICATED BY FIGS. 30 AND 31.

	FIG. 30.	FIG. 31.
Cost of land	\$ 74,790	\$ 74,790
Curbing	2,919	4,025
Asphalt pavement.. . . .	31,054	26,653
Cement walks	8,343	10,480
Sewers	4,954	9,360
Total cost	\$122,060	\$123,908
Or if macadam is substituted for asphalt pavement	108,985	113,528
Total number of plots.. . . .	204	259
Average area of plots	4,041 sq. ft.	3,033 sq. ft.
Cost per plot with asphalt pavement.. . . .	\$598 33	\$478 41
Cost per plot with macadam pavement.... .	\$533 75	\$438 33

Most of the lot subdivisions are determined by the real-estate developer, who is naturally disposed to divide each block into lots of the size that can most readily be disposed of at the time, although in many cases his purpose is to give a distinctive character to the neighborhood. Where the plots are of generous size they can quite readily be adapted to changed

¹ Proceedings of the Seventh National Conference on City Planning, Detroit, 1915.

conditions and other uses, but where the lot units are small this is very difficult, owing to the fact that so many different owners must be dealt with in order to combine a number of small plots into sufficiently large units to meet the needs of the altered use of the property. The city authorities, recognizing

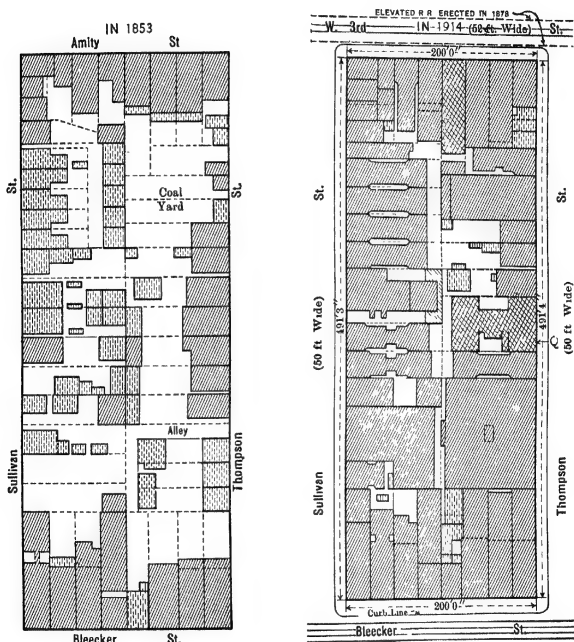


FIG. 32.—Showing changes in subdivision and in area built upon in typical block in New York, 1853 to 1914.

the desire of the developer to provide lots and houses which are readily salable, is generally disposed to consent to the establishment of block dimensions which will make this possible. In Philadelphia a considerable portion of the city was originally laid out in blocks 396 by 400 ft. in size, bounded by streets 50 and 60 ft. wide, and, in order to provide for the

single-family houses, so characteristic of that city, these blocks have frequently been divided into smaller ones by introducing two additional streets 40 ft. wide, resulting in the creation of 168 building plots varying from 14 to 16 ft. in width and from

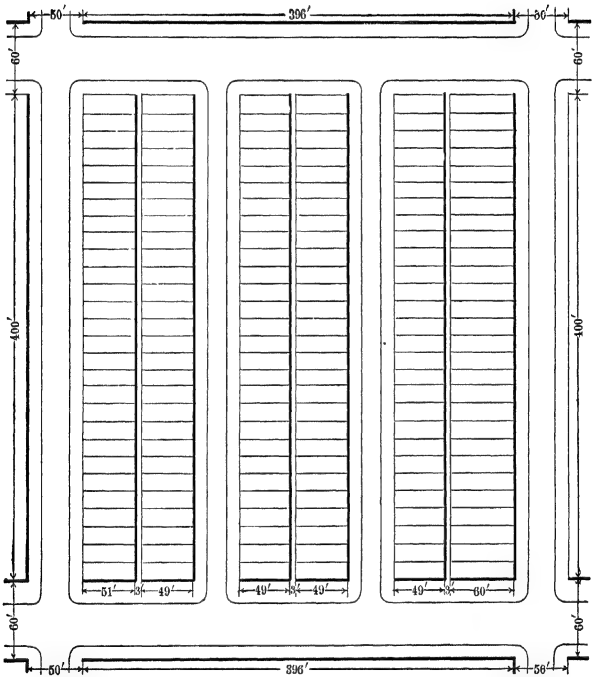


FIG. 33.—Plan showing a method frequently employed in Philadelphia of subdividing a block 396 by 400 ft. in size to provide 168 building plots or 46 dwellings to an acre.

49 to 60 ft. in depth, with passageways three feet wide separating the lots in the rear. The city ordinances prescribe a minimum width of 14 ft. for any dwelling house and a minimum open space of 144 sq. ft. for each lot, and these lots are used to the

greatest allowable extent, while some builders have attempted to count the rear passageway in the required open space. A typical plan of this subdivision is shown by Fig. 33. This may be better than four and five-story tenements on lots 25 by 100 ft. housing four families on each floor, but it is a too intensive use of the land, which Philadelphia is trying to find means of

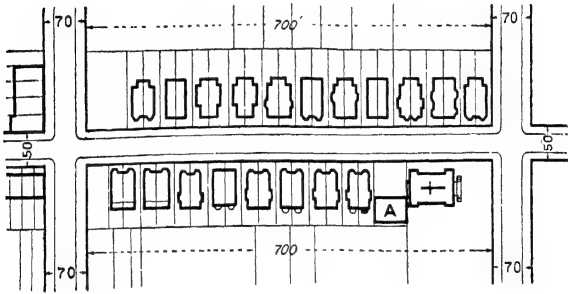


FIG. 34—Group of semi-detached houses served by a central heating plant (A). The plant is depressed and its chimney is combined with that of the church. (See Pl. 18, p. 132)

correcting. A very satisfactory and attractive manner of subdividing a block 200 by 700 ft. for high class semi-detached houses has been adopted to a limited extent in Brooklyn, and is shown by Fig. 34. In this block there is a central heating plant built below the surface of the back-yards, the chimney of which is combined with that of a church at one end of the block.

CHAPTER VII

PARKS AND RECREATION FACILITIES

WHILE most cities which have not had their beginning in a cluster of buildings grouped about a baronial castle have had as their nucleus some public open space where the people were wont to gather for meetings or for recreation, the creation of a system of parks or playgrounds has been quite a recent development in city building. It is true that open spaces such as we would to-day call parks date from the earliest times. The ancient Egyptians appear to have had in their cities certain open spaces usually treated in a formal manner and adorned with sculpture and architectural features, but these were probably little more than gardens. The Romans created some great parks which included gardens, athletic fields and areas treated as are our formal parks with canals, fountains and cascades. In the capitals of Europe some of the parks were developed during the seventeenth and eighteenth centuries as royal pleasure grounds. They were laid out on the most extensive scale and were lavishly adorned with sculpture, fountains and other decorative features. It was in the design and construction of these great royal estates or parks that the profession of landscape architecture, as we know it, came into existence. Such parks are now either the common property of the people or, if still nominally an appurtenance of the Crown, the public has the free use of them, and the château or schloss or palace about which they are laid out has become a picture gallery or historical museum. The city park, laid out, acquired and developed as a public playground is a modern idea, and is a result of the steadily increasing size of our cities. Even yet, the park system is a haphazard growth and its place as a part of the city plan is not fully appreciated,

although its title to such recognition has been insisted upon in a preceding chapter. It is obvious that the needs of a city for open spaces cannot be anticipated to the same degree as can its requirements for transportation and a street system. These latter depend to such an extent upon natural features that the general line of their development suggests itself. Estimates have been made of the percentage of a city area which should be devoted to parks or the proper number of people to each acre of parkland, but the needs of an urban community cannot be determined in this manner. A compactly built city where the individual dwellings have no open spaces about them, where the streets are narrow and where the average number of occupants to each dwelling is large, requires a greater park space per capita and a larger space in proportion to the area of the city. On the other hand, where dwellings are detached and each has its garden, where the streets are broad and lined with trees, the need of parks is much less. The industrial town or district has a far greater need of park reservations than does the residential town or district, while it usually has less. The great variation which is found in the park areas in different cities in proportion to population and total area of the city is indicated by Table V, in which are given the average density of population of the area within the city limits and the area of park reservations within or contiguous to the city.

It will be seen that Paris exceeds all of the other cities in the list in density of population, being compactly built within the old city walls and not having annexed adjacent territory; but its park area is greatest in proportion to that of the city, owing to its two great contiguous parks. Paris actually has an acre of park for every 554 of its population, although the open spaces in the built-up portions are very meagre.

Berlin comes next in density of population, but greatly exceeds all other German cities in this respect, while its park areas, though slightly above the average in percentage of the area of the city, are less in proportion to population than those of any of the other cities except Marseilles and Lyons. It might

TABLE V
SHOWING PARK STATISTICS OF VARIOUS CITIES

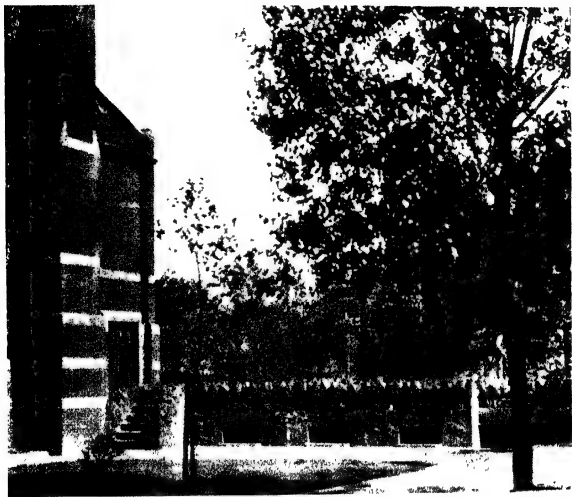
CITY.	POPULATION	AREA IN ACRES	PARKS		POPULATION.	
			AREA IN ACRES	% OF TOTAL AREA	PER ACRE OF CITY	PER ACRE OF PARK
London (Met. Dist.)	7,251,358 <i>a</i>	443,424	15,901 ¹	4	16	456
London (Adm. Co.)	4,521,685 <i>a</i>	74,816	6,675	9	60	677
New York. . . .	5,333,539 <i>d</i>	189,662	7,738	4	28	689
Paris.	2,847,229 <i>a</i>	19,279	5,014	26	148	554
Chicago	2,393,325 <i>d</i>	124,448	4,388	4	19	545
Berlin.	2,082,111 <i>c</i>	15,696	1,034	7	133	2,014
Philadelphia. . .	1,657,810 <i>d</i>	82,933	5,143	6	20	322
Hamburg. . . .	1,006,748 <i>b</i>	30,527	808	3	33	1,246
Birmingham . .	840,202 <i>a</i>	43,601	1,414	3	19	598
Liverpool. . . .	760,000 <i>d</i>	21,219	1,282	6	36	593
St. Louis	734,667 <i>d</i>	39,100	2,765	7	19	266
Boston.	733,802 <i>b</i>	27,612	3,545 ²	13	27	207
Munich	636,000 <i>c</i>	23,633	1,783	8	27	356
Leipzig.	615,000 <i>c</i>	19,217	570	3	32	1,079
Baltimore	579,590 <i>d</i>	19,290	2,402	12	30	241
Cologne	544,400 <i>c</i>	29,001	745	3	19	731
Marseilles. . . .	528,000 <i>a</i>	6,176	210	3	87	2,562
Lyons	523,796 <i>a</i>	10,045	257	3	52	2,038
Sheffield. . . .	476,971 <i>d</i>	24,347	682	3	20	699
Düsseldorf. . . .	407,000 <i>c</i>	27,562	2,738	10	15	149
Washington. . . .	353,378 <i>d</i>	38,400	5,212	14	9	68
Kansas City . . .	281,911 <i>d</i>	37,443	1,952 ³	5	8	144
Roxhester	241,518 <i>d</i>	17,352	1,836	11	14	133
Averages including the County of London, but not the Metropolitan District				6 32	30 5	483

a, b, c and *d* represent population in 1911, 1912, 1913 and 1914 respectively.

¹ Of the park reservations in the London Metropolitan District, 4026 acres are owned and maintained by the Government, 5070 acres by the London County Council, 6491 acres by the City Corporation, and 314 acres by the several Metropolitan Borough Councils.

² This area does not include the system of wild parks outside of the city of Boston, but within a radius of 15 miles. These parks have a combined area of 9464 acres, and if they were included, they would make the total park area 47 per cent of that of the city and would reduce the number of people per acre of park to 57.

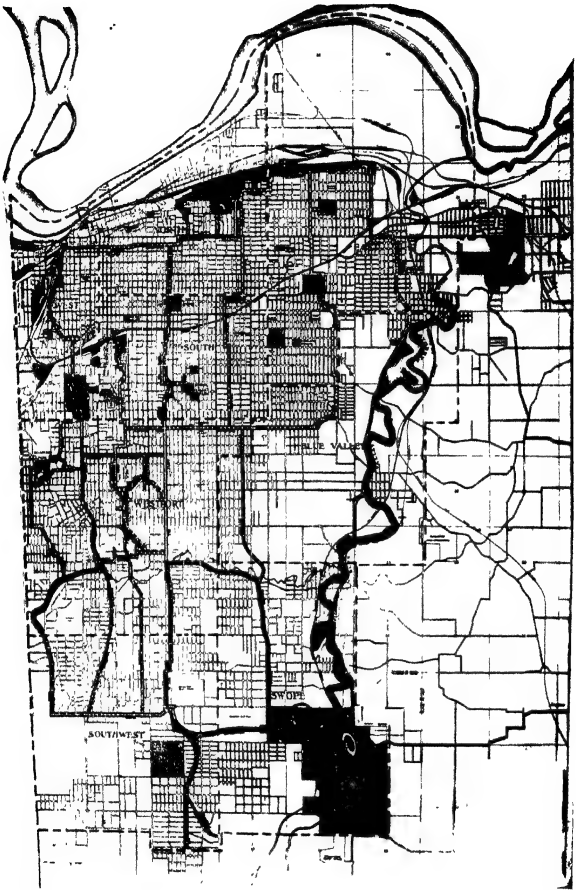
³ Kansas City, in addition to its park area, has an unusually complete system of connecting boulevards and parkways, with an aggregate length of more than 35 miles.



A depressed central heating plant serving a group of houses and using the chimney of the adjacent church. See Fig. 34 (p. 120).



The site of Canberra, the proposed Australian Capital City. Reproduced from "Town Planning for Australia," by George A. Taylor. See Plate 15 (p. 87).



Plan showing the complete system of parks and parkways of Kansas City and the several park districts upon which was assessed the cost of the parkways (pp 133, 139 and 178).

be thought that Berlin's small proportion of parks to population is due to the fact that it does not include within its boundaries a number of nearby suburban towns which are less intensively developed, but the contiguous city of Charlottenburg, which had a population of 325,300 in 1913, has a density of 56 persons to the acre, or more than any other German city in the list, except Berlin itself, although it provides but one acre of park to 528 people.

In marked contrast with the cities just mentioned is the national capital of the United States which has but nine people to the acre, has devoted 14 per cent of its area to parks which include the spacious grounds around the public buildings and has an acre of open space to every 68 of its population. Kansas City, while having a density of population of but eight to an acre, has devoted five per cent of its area to parks and has an acre of park land to every 144 of its population. Especially worthy of consideration is the method by which this city has bought and paid for its system of parks and parkways, which is described in the chapter on Financing a City Plan. (See Pl. 19.)

While New York contains within its limits the most densely populated spots on earth, the average population per acre is less than in Leipzig, Hamburg or Liverpool and its park reservations in proportion to area and population are greater than those of Leipzig and Hamburg but less than those of Liverpool. New York's parks, however, are not well distributed, as will be seen by an examination of Table VI. This table includes only the parks which are actually owned by the city. In the Boroughs of Queens and Richmond, which are largely undeveloped, a few park reservations have been acquired and others have been proposed and tentatively mapped, but no steps have yet been taken to acquire them. The most feasible time to do so would be before the tracts are built upon or otherwise improved; but the experience of most cities has been that acquisition is deferred until the cost has become so great that the projects frequently have to be abandoned.

TABLE VI

SHOWING THE DISTRIBUTION OF PARK AREAS AMONG THE DIFFERENT BOROUGHS OF THE CITY OF NEW YORK

BOROUGH	POPULATION.	AREA IN ACRES	PARKS		POPULATION.	
			AREA IN ACRES	% OF TOTAL AREA	PER ACRE OF CITY	PER ACRE OF PARK.
Manhattan.....	2,536,716	14,038	1,443	10 3%	181	1,758
Brooklyn.....	1,833,696	45,327	1,201	2 7%	40	1,527
Bronx... ..	529,198	26,523	3,957	14 9%	20	134
Queens.	339,886	67,174	1,070	1 6%	5	318
Richmond	94,043	36,600	67	0 2%	3	1,404
Entire city.	5,333,539	189,662	7,738	4 1%	28	689

An examination of the table of park statistics shows the greatest variation in percentage of park area and in the number of persons to an acre of park, and demonstrates the futility of attempting to estimate the actual needs of a city in this respect. Mr. Charles Downing Lay, editor of "Landscape Architecture" and formerly landscape architect of the New York Department of Parks, in a paper read before the Conference of Mayors of the State of New York in 1914 estimated the park needs of a community of 100,000 people as follows:

Wild parks..	700 acres
One large rural park.....	400 "
Ten small parks.	250 "
Fifty playgrounds	100 "
Gardens, squares, etc.	50 "
Total	1500 "

He assumed that $12\frac{1}{2}$ per cent of the area of the city would be devoted to parks so that the area of the city would be 12,000 acres, giving an average density of population of $8\frac{1}{3}$ persons per acre, and an allowance of one acre of park to $66\frac{2}{3}$ people. This generous allowance is closely approached by Washington, which even exceeds the percentage of area devoted to parks; but, as noted in another chapter, Washington has been

planned and built on a grand scale, largely at the expense of a great and wealthy nation, and no ordinary city could possibly afford such a development. Boston, too, has approximated Mr. Lay's suggestion as to the proportion of its area to be given over to parks and, if her great wild parks are included, has greatly exceeded it, while Düsseldorf is not far behind, but these two cities are so clearly exceptional as to be in a class by themselves.

It is frequently argued that it is folly to select and acquire park reservations until the actual need of them is unquestionable, and that they shall then be placed where that need is greatest; that the additional expense of their acquisition at the enhanced value due to the city's development, and even to the destruction of buildings if the area selected shall have been built upon, will be less than the carrying charges and loss of taxes if they are bought in advance of their actual need, that unimproved parks are of little value and that their development at great cost is likely to be undertaken prematurely if they are purchased at an early date. There may be instances where this has proved to be the case, but they are the exception rather than the rule. A word of caution against premature or over-development of park area may not be out of place. Mr. S. D. Adshead has entered his protest against the disposition to introduce so many paved walks, terra-cotta vases, etc., in places which would be in far better character if left like Hampstead Heath or some woodland glade. "Why," he asks, "spend so much in making beautiful fields into ugly parks?"

The unrelated and inconveniently located parks in many cities indicate quite clearly that they were selected with little regard to each other, that the most available or cheapest land which offered itself at the time was taken, or, as is not infrequently the case, that the final selection was controlled to a large degree by the persistent effort or the influence of those who may have had property which they would like to dispose of at a good price or who had other holdings in the immediate neighborhood, the value of which would be increased or which would be made marketable by the location of a park in the

vicinity. The argument that a park should not be acquired unless it is at once to be improved, is an unsound one.

Public pleasure grounds may be divided into three classes: the wild park, where the natural conditions remain undisturbed as far as possible; the developed park, where by skilful treatment and planting such natural features as meadows, woods and lakes are combined; the formal park, which is more in the nature of a garden. A city park, if of sufficient size, may pass successively through these stages. There is no greater boon to the city dweller than the opportunity to frequent a place where nature has been interfered with to the least possible degree. A few walks and roads through the woods are all that is necessary in the way of improvement. As such parks become more frequented, and as their natural beauties are much more likely to be destroyed, a greater degree of development with more strict policing may be required and gradually the wild park becomes a developed park, while portions of it may in time be treated as a formal garden. This process of evolution may cover a decade or a generation, and meanwhile other wild parks lying further out may be acquired. Boston has exercised unusual foresight in acquiring a group of such parks well outside of the city limits and the organization and administration of its system of metropolitan parks is admirable (Fig. 35). This system, as indicated by Table V (p. 132), covers an area of 9464 acres in addition to the 3545 acres within and without the city limits, but under the jurisdiction of the local authorities. There are 14 different park reservations located in ten cities and 19 towns, but all within a radius of about 15 miles from the State House. It also includes nearly 35 miles of parkways with an area of 963 acres, which is equivalent to an average width of 227 ft. for the parkways.

Parks are commonly the beauty spots of a city, and when fully developed often become the most valuable land in the district in which they are located; but it does not follow that they had a special value when they were located and acquired. On the contrary, the areas most suitable for park purposes are

often of little value as real estate when selected, although it usually happens that any property which the city or any great corporation wants immediately acquires enormous value in the opinion of its owner. The private corporation is usually able

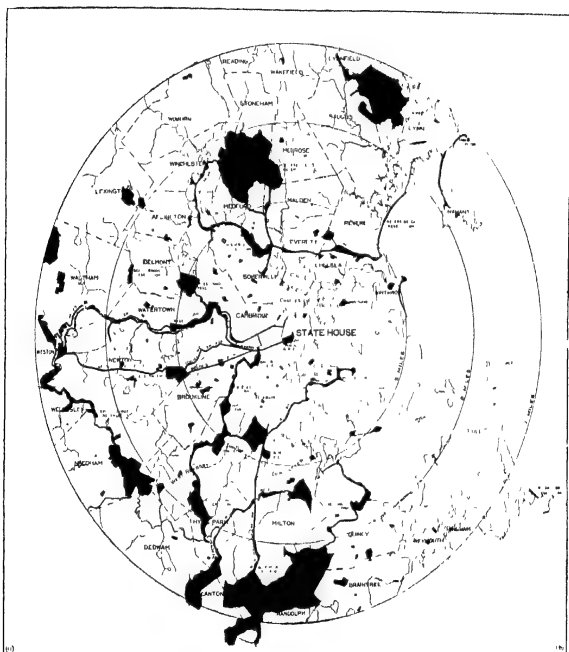
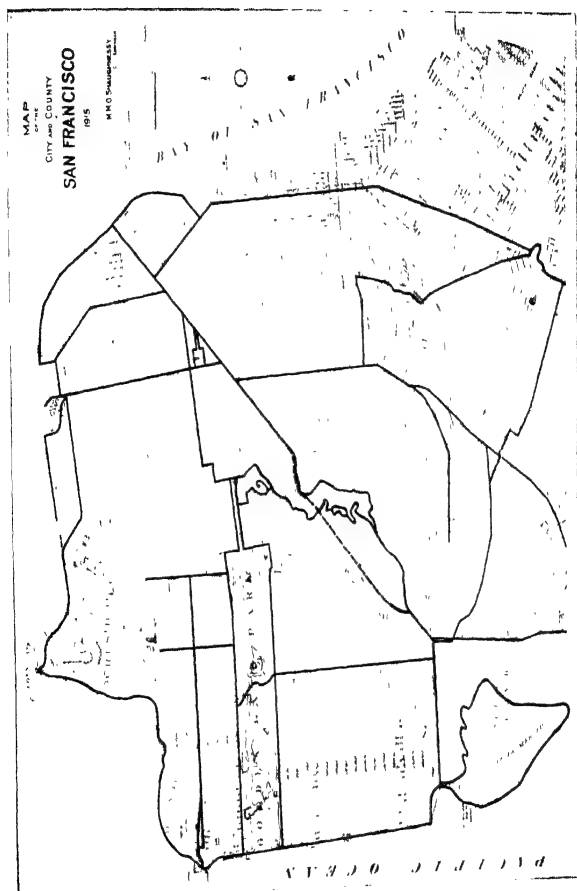


FIG. 35.—Showing the complete and well-distributed system of parks and parkways in the Metropolitan District of Boston. Reproduced from the report of the Metropolitan Park Commission.

to secure what it needs at a fair market value through agents whose connections are unknown to the owners, but the city must conduct its business in the limelight, its plans and purposes must be fully known and discussed before an acre of land can be secured, and not only will the land needed to carry out

these plans acquire new value in the opinion of the owner, but experts can readily be found to testify to such values. The land which in time will make the best parks will often have been passed over by the real estate developer as unsuited to his purposes: precipitous hillsides where the cost of development would be prohibitive; creek bottoms and meadows which may be subject to periodic flooding, wooded tracts somewhat off the existing lines of transit; marshes which may be suggestive of malaria and mosquitoes—any or all of these present great opportunities for effective and economical development into parks. Their actual value is small, the return from them in taxes is insignificant and to carry them until their development is needed will not be a serious burden. It may be apparent that park areas will ultimately be needed in parts of a city which are now in process of development and where values are likely to increase quite rapidly. Under such circumstances it would be quite feasible to acquire the land for the purpose and lease it for a term of years sufficiently long to justify the lessee in erecting such buildings as might be required for his purpose, the ground rental being sufficient to pay the carrying charges and the loss in taxes until such time as the needs of the neighborhood make it necessary to carry out the purpose for which it was originally bought. Such a course would involve little risk and would probably save a substantial sum to the city treasury.

But we should consider the planning of a park system as well as a transportation or a street system. Such a system is just as much a part of a comprehensive plan as are transportation facilities and streets. While it is obviously impossible to formulate as definite a plan for parks as for streets, there must be some relation between them, not, perhaps, an economic relation, not even a ratio between the total area of parks and the area of the city, not a maximum and minimum of size, nor a relation between length and breadth, nor a theory as to the best shape. It may be said that in planning a city the park reservations should be governed by the street system. True,



The boulevard system of San Francisco. Reproduced from plan kindly furnished by Mr. M. M. O'Shaughnessy, City Engineer (p. 139).

PLATE 21



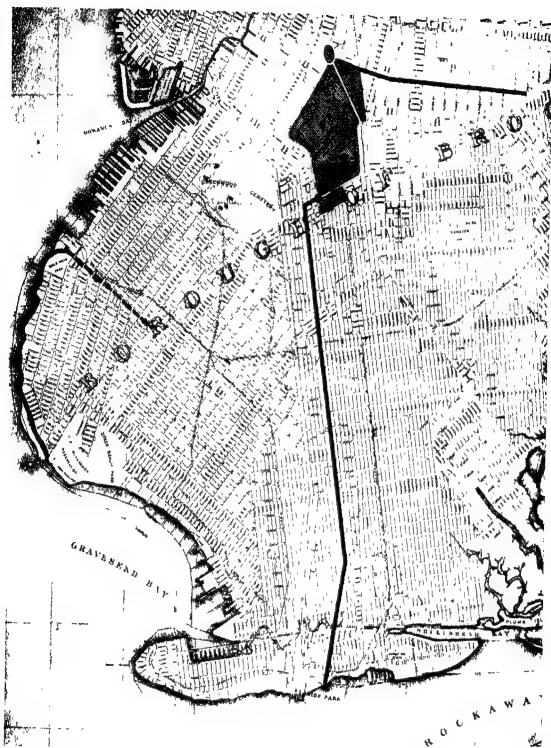
The extensive system of parks and connecting parkways in the Borough of the Bronx, New York. The combined area of the parks is 15 per cent that of the borough (p. 139).

but the streets should also bear some relation to the park system, with due emphasis upon the word system. It is not an uncommon practice to lay out a street system for the entire territory to be platted with the idea that, when the time comes to decide upon the extent and location of the parks, such streets as interfere with them can be discontinued, but that at least one entire block here and there will be taken and in some cases a group of blocks. In other words, the idea frequently appears to be that while the streets should be laid out in accordance with the topography and with such foresight as is possible to meet the probable development of the city, the parks can be left for future consideration, their location being determined by expediency and the needs of the moment.

If there ever is to be a real park system, there must be suitable connections between the different units of that system. If the street plan only is made and the parks are left to chance, there can be no proper connections and consequently no park system. Isolated parks, with nothing but business or heavy traffic streets between them, lose much of their beauty and a large part of their possible utility, this statement, of course, referring to the chief parks of a city which are provided with driveways and not to the small neighborhood parks. The great beauty and value of the park systems of Boston and Kansas City and of the series of lake front parks of Chicago are due in large measure to the admirable system of parkways which connect them (Fig. 35, p. 137, and Pl. 19, p. 133). San Francisco has also planned and partly carried out a complete system of boulevards, one of which follows the shore of the Pacific Ocean for several miles (Pl. 20, p. 138). If one had to find his way from one park to another through a series of narrow, congested business streets or even through residential streets, which, however neat and attractive they may be, are devoid of all park features, the charm and value of those parks would be far less. The great parks of the Borough of The Bronx, in New York City, are connected by an admirable system of parkways, one of which is 600 ft. wide and another is 400 ft. wide but not yet fully

developed (Pl. 21), while those of the other boroughs are conspicuously lacking in such connections, although the superb Riverside Drive of Manhattan connects two parks which are without other drives than this, which skirts the edges of both. Brooklyn's one fine park has parkways 210 ft. wide with three roadways extending from two of its sides, one of them leading to the ocean where it stops abruptly and the other being lost in a series of business and traffic streets, while its Shore Road, which rivals Manhattan's Riverside Drive, must be reached and left through commonplace streets (Pl. 22). The designation "parkway" is often misleading. It might naturally be assumed that a street so named would have some of the characteristics of a park, that it would at least be well planted with trees and have a roadway devoted to restricted traffic, but this is not always the case. Because a street or avenue leads from one park to another, or because jurisdiction over it is vested in a park department or commission, it is not necessarily a parkway in the proper sense of the term. Parks should be connected by parkways; they need not be of extreme width, but they should have some distinguishing park features, so that one leaving a park by them would know that he is on the right road to another park. In planning a system of parks, therefore, provision should be made for properly connecting them. Experience seems to show that streets more than 100 ft. in width rarely develop into business thoroughfares, so that if those which are to serve as park connections are given a width of 120 to 150 ft., business will be likely to avoid them and such a width will be sufficient to provide certain park features when the time comes for their development.

The judicious selection of the park areas will require skill and judgment, and the advice of a competent landscape engineer or architect should be secured. To defer this until the time comes for actual development is folly. Expert knowledge as to the possibilities of the different park sites is worth far more than skill in adapting an unsuitable site to the desired purpose. The precise size and boundaries of a park need not be



Plan showing Prospect Park, Brooklyn, the two parkways leading from it and the Shore Road which lacks connection with the rest of the city (140).



Views in the wild park donated to the City of Toronto. Natural conditions have been interfered with as little as possible. Reproduced from photographs supplied by courtesy of the Toronto Park Department (p. 441).

determined when the land for it is acquired. It could well be bought as acreage property and its boundaries may be very irregular. When the street system about it is finally fixed the park can be trimmed down to such form as is desired and to such size as the locality will probably require. Some of the land which has been acquired may be left outside of the boundaries finally decided upon; it may be a few building lots or it may be several city blocks. In the latter case an admirable site for a school or a library will thus be provided which will front upon the park, or perhaps a block away there will be a convenient and not too conspicuous site for a police station or a fire-engine house. In either case there may be land left which can be sold at such an advance over its original cost and carrying charges as will materially help to pay the cost of the park. (See Fig. 24, p. 107.)

Glasgow bought 245 acres of land to create its Queen's Park, which was finally laid out to include 141 acres, and the remaining area is said to have been sold for residence sites for a sum sufficient to pay the entire cost of the park. The creation of a city park system has in some cases been started by gifts of land for such purposes. Dr. Albert Shaw, in his book on "Municipal Government in Great Britain," says that Birmingham had no public parks until 1856, when a ten-acre park was presented to the city and another of 31 acres was given the following year. In 1864, the city bought 50 acres for parks and, in 1873, still another park of 60 acres was presented to the Municipal Corporation. In 1863, a tract of 165 acres on the outskirts of the city was given to Toronto for a public park by one of her public-spirited citizens, and to this the city has added an equal area by purchase. This is still a wild park possessing many picturesque features (Pl. 23). One of New York's parks was given by two ladies as a memorial to their father, and while its area is but a little over nine acres, it had an assessed value when presented of more than \$600,000.

Some of London's great parks, such as Hyde, St. James, and Green Parks, Hampton Court and Kew Gardens are appur-

tenances of the Crown, but they are as fully open to the public as those which have been acquired at the city's expense. Dr. Shaw says that the Bois de Boulogne was part of an ancient forest owned by the state and was granted to the city of Paris in 1852 on condition that it be improved as a modern park, and of the 14,000,000 francs expended upon its improvement a large part has been recouped. The Bois de Vincennes was also acquired from the state, which consented to the sale by the city of a portion of the area, by which means more than half of the 24,000,000 francs expended in its development as a park was recovered.

While topographical features should to a large degree control the selection of the park areas of a city their general arrangement and their location with respect to each other should receive careful study. Every city of considerable size has one or more large parks, sometimes in the very heart of the city, if it was acquired at an early date, often on the city's outer edge. London has its Hyde Park of 364 acres and Kensington Gardens with 274 acres, both in the heart of the city, and Epping Forest in Essex with an area of 5560 acres. Paris has its Bois de Boulogne with over 2100 acres on the west and the Bois de Vincennes about 2300 acres in extent on the east. Berlin has its Tiergarten of 630 acres, which, though the private property of the Crown, is a public park, as is also the Royal Forest of the Grunewald, covering 11,350 acres a little further out on the way to Potsdam. Vienna has its Prater Gardens of 1500 acres; Dublin its Phoenix Park, nearly 2000 acres in extent. Budapest has in the Stadtwaldchen a tract of about 1000 acres, while Margareta Island in the Danube, nearly two miles long and one-half mile wide, once the property of the city but given to one of the archdukes some half a century ago as a hunting ground, is kept in beautiful condition and is open to the public as a pleasure ground. New York has its Central Park of 862 acres in Manhattan and its Prospect Park of 575 acres in Brooklyn, both in the densely built parts of the city, and its Pelham Bay and Van Cortlandt Parks with a combined area of 2888 acres

along its northerly boundary. Philadelphia has its Fairmount Park of 3316 acres, almost in the heart of the city. Boston has its Blue Hills Reservation of 4906 acres, its Middlesex Fells of 1898 acres, and its Lynn Woods, almost as large, all outside of the city limits but within the metropolitan district.

It appears that a number of cities have with admirable foresight gone some distance beyond the city limits for playgrounds for their people. In these projects the State or even the National government may co-operate with the city or undertake improvements which will supplement those of the city. New York City and Westchester County have jointly undertaken to preserve the natural beauty of the Bronx River by building the Bronx River Parkway which will extend from Bronx Park to the new Kensico Reservoir, a distance of 15 miles. The climax of a beautiful drive will be reached below the great dam at the reservoir, where the grounds will be treated as a park (Pl. 24, p. 146). Some of the attractive bits of the Bronx River will thus be preserved (Pl. 25, p. 147).

Essex County in New Jersey, which includes within its limits a number of populous towns, has established a system of 13 parks covering an area of 3206 acres, one of the park units containing nearly 2000 acres. The system includes athletic fields, playgrounds, golf links and lakes for boating and skating, and more than \$6,000,000 has been expended in its development. The States of New York and New Jersey are co-operating in the development of the Palisades Interstate Park. This movement originated in an effort to preserve the picturesque features of the palisades along the westerly bank of the Hudson River opposite the northerly part of New York City and the adjacent towns in Westchester County. The project has assumed much greater importance and a larger scope through the gift by Mrs. E. H. Harriman of a tract of some 10,000 acres. The present extent of the system, which includes 18,000 acres, is indicated by Fig. 36 (p. 144). This great system of parks is so near New York and the neighboring cities in New Jersey that it may be considered as part of their recreation grounds.

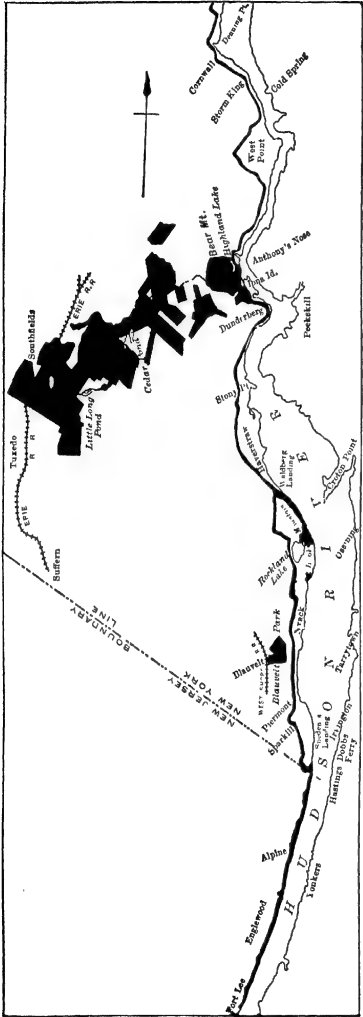


FIG. 36.—Plan showing the system of parks under the jurisdiction of the Palisades Interstate Park Commission. Reproduced by courtesy of the Commission from its annual report.

A very remarkable national park, so near to centers of population that it can be made readily accessible to the people, is Strathcona Park on Vancouver Island. It covers an area of 532,000 acres in the central part of the island. It is still in large part unexplored, owing to its very rugged character. It has within its limits forests, rivers, waterfalls, canyons, glaciers and snow-capped mountains, while fish and game are plentiful. Facilities of access to it are now very meager, but, when they are supplied, it can readily be reached from the cities of Victoria and Vancouver and even from the towns along Puget Sound in the State of Washington.

One of the recent park improvements carried out by the city of Boston is as unusual as it is admirable, namely, the creation of the Charles River Basin. Insanitary conditions are often remedied through the costly process of buying up the blighted areas, razing the buildings and converting the space occupied by them to some public use, but in this instance the same end was achieved, not by destroying improvements, but by creating something new on property which was previously unused and useless. The Charles River was a tidal stream the shores of which, though bordering some of the best parts of Boston on the one side and of Cambridge on the other, were unsightly and unwholesome, especially at low tide. By the building of a dam across the river with a lock to accommodate boats, the construction of quay walls and filling in behind them and providing walks and drives on the reclaimed land the shores of the river have been converted into rare beauty spots and the stream itself has become an attractive fresh-water lake. The conditions which prevailed before the improvement was undertaken and the radical change which has been brought about are indicated by the illustrations (Pl. 26, p. 150).

While these parks are invaluable, many of the poor people cannot afford even the small fare to reach them, and it is the smaller neighborhood parks that really count for most in the everyday life of the masses of the people. These small parks should be so located that one of them is within easy walking

distance of every part of the city. Mr. John A. Brodie, the City Engineer of Liverpool, has suggested that in planning a system of parks they should be carried out radially from the center of the city somewhat in advance of its development, while in large cities wide streets can be combined with open spaces which will practically become part of the park system of the town, giving a result far better than the old-fashioned plan of a number of blocks dotted irregularly about the city.¹ Dr. Werner Hegeman of Berlin, points out that such a radial system of parks and boulevards will provide "a broadcast fresh-air drainage for the whole city."

While parks are becoming more and more used as playgrounds rather than places for the exhibition of the skill of the landscape artist, while warnings to "keep off the grass" are much less frequent, there is still a need of quiet resting places for those who cannot indulge in active play. The athletic field and the well-organized playground should not take the place of the neighborhood park, but is a separate and distinct need. These playgrounds are a quite recent development and their scientific organization and management has become almost a distinct profession. Perhaps there is a disposition to exaggerate the value of the playground and substitute it for the park instead of making it supplemental thereto.. As Mr. George E. Kessler, Landscape Architect of the Kansas City Park System, says: "The average playground enthusiast understands the term only as applied to a group of swings, slides and all the other forms of violent exercise, disregarding almost entirely the value of natural beauty as an inducement to enjoy outdoor recreation in surroundings that appeal to and educate the growing child."

Chicago appears to have taken the lead in the development and administration of its playgrounds and athletic fields, the former being intimately related to the public schools. The beneficial results of such provision for recreation and the general principles governing the distribution of the different units are outlined by Mr. E. H. Bennett as follows:

¹ London Town Planning Conference, 1910, page 238.



The new Kersal Dam in New York's water supply system showing the treatment of the spot in front of the dam. This will be the north-east end of the Bronx Park, N. Y. 12 miles in length. Reproduced from photograph kindly furnished by the Board of Water Supply of New York, pp. 125 and 126.

PLATE 25



Typical views of the Bronx River, New York which will be preserved by the creation of the Bronx River Parkway. Reproduced from photographs kindly furnished by the Bronx River Parkway Commission (p. 143).

Police records show an extraordinary decrease of youthful crimes in the neighborhood of playground parks. Already in Chicago, with these parks only a few years old, the new houses in their vicinity are showing a marked improvement over the old.

The location and apportioning of these playgrounds is a study in itself and is fast becoming an exact science. The fundamental point of view taken is that parks should be brought to the people rather than the people to the parks; that the large investment in public schools should be utilized to its limit, and that the development of the playground system should progress with the growth of the city and with the development of the schools. It is found that in most cities the schools are concentrated where the population is densest. From observations of small playgrounds already built it is found that a good arrangement of play and gymnasium apparatus can be placed on one and a half or two-acre plots and with a proper arrangement of play periods about 700 to 1000 children can be accommodated per acre. With these points in mind as a basis of discussion, a minimum of two acres was adopted as a reasonable figure for a playground, and at, or around, each school a plot was placed on the basis of 700 to 1000 children per acre. These open spaces and the actual school building should be used to a large extent as a recreation and social center in the evenings. In this way large numbers of working people can be served with social activities.

In order to provide athletic facilities for the older children and the working population, it was decided, after observation and study of such athletic fields as have been developed, that fifteen to twenty acres should be the minimum unit. These should be reasonably close together, not more than two miles apart, so that no person would find it a hardship to get to them after working hours or on Saturday or Sunday. At each of these large athletic centers there will be developed swimming and gymnasium facilities, together with branch libraries, auditorium and all other social necessities which go to complete and fill in the leisure time of the working people. These facilities should be provided for both men and women.¹

While it is generally admitted that the establishment of a park will result in benefit to the neighborhood in which it is located and that at least a portion of the cost of its acquisition can with justice be assessed upon the district, this is not the case with respect to playgrounds. They are necessarily somewhat noisy, and the

¹ Proceedings of the Fifth National Conference on City Planning, Chicago, 1913, pages 101-103.

benefit resulting from their establishment will extend rather to the property which is far enough away to be free from the noise, but near enough to render them readily accessible. To assess the cost of acquiring land for playgrounds in the same manner as in the case of parks—that is, by a graduated assessment with the highest rate on frontage, would, therefore, involve some injustice. The method followed in a recent case in Brooklyn was due to this consideration. Mrs. Betsey Head, who died in 1907, left a legacy of nearly \$190,000 to the City of New York for playground purposes. There were many applications for the expenditure of all or a portion of these funds by the purchase and development of sites in different localities, but the municipal authorities decided that it should be devoted to the improvement and equipment of playgrounds rather than to their acquisition. The citizens of an especially congested district proposed that the city acquire four blocks and assess the cost of so doing at a flat rate over a district of such size that the expense would be about \$10 for each lot unit of 2000 sq. ft. This was done, the area of assessment being made approximately circular in form with a diameter of about 2 miles. Three of the blocks are to be devoted to an athletic field, baseball and football grounds, swimming pool, etc., for larger children and grown people, while the fourth block is to be set aside as a recreation ground for mothers and small children.

While much more space could be devoted to the subject of scientifically organized play, it is more nearly related to city administration than to city planning, and will not be further discussed, except to emphasize the necessity of keeping in mind the need of provision for it when working out a general plan.

CHAPTER VIII

PUBLIC BUILDINGS AND CIVIC CENTERS

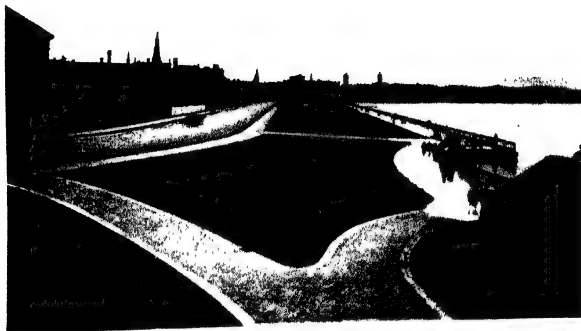
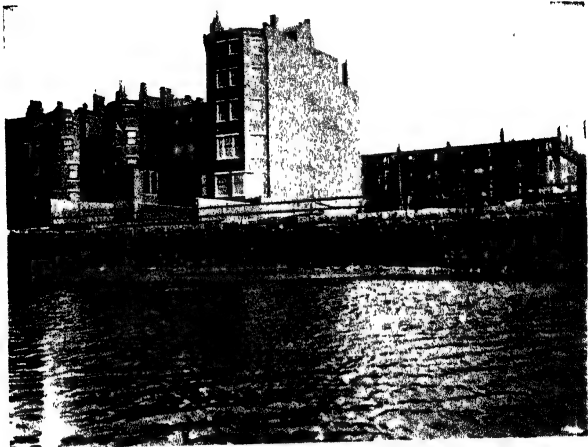
IN considering the subject of public buildings and their location, the words "public buildings" will be so broadly construed as to include not only those in which the business of the nation, the state or the city may be conducted and such buildings as public libraries, museums, etc., which are frequented by the public, but they also will include buildings constructed and maintained for the exercise of any of the functions performed by any public authority, such as schools, penal and charitable institutions, markets, hospitals, police and fire houses, baths, structures connected with water supply and drainage and even bridges and monuments. They will also include churches and buildings used for amusement and entertainment under private as well as public management, and the various buildings and plants, many of which in European countries are maintained by the public authorities, but which in America are commonly left to public-service corporations, among these last being railway stations and terminals, lighting and heating plants, financial institutions, etc. The recent efforts to so group important public buildings as to form effective civic centers, while worthy of a separate chapter, will also be treated in this connection.

In ancient cities individual dwellings were modest and unpretentious, while public buildings were dignified and beautiful. Palaces and castles, the abodes of reigning princes or their representatives, typified the power and dignity of the state, and nothing was too costly, no scale was too great to impress the people with their power and grandeur. The cities were rich and powerful and their buildings were planned and adorned for the purpose of impressing their citizens and those of other

cities with their power and dignity. Churches and cathedrals were the expression of the devotional spirit of the people, and their wealth or their labor were lavished on these structures, whether religious enthusiasm, superstition or fear of ecclesiastical tyranny may have prompted their giving. The powerful guilds built houses of beauty, and these were commonly grouped about "places" dominated by the Rathaus or the Hotel de Ville in such a manner as to produce a charming and dignified effect. In modern cities, especially in America, show places are usually the homes of the merchant prince, the successful patent-medicine man, or those who have suddenly achieved fortune or local fame. In some cases these fortunate individuals have made an effort to perpetuate their memories and win the gratitude of their fellow-townsmen by building, and sometimes generously endowing, some semi-public institution, while in others the manifestation of their public spirit has taken the form of a more personal memorial, such as a statue or fountain. In every case there is quite sure to be a tablet or inscription reminding the public of the donor. Limitations imposed by the giver concerning the site or the treatment are frequently the despair of the architect or sculptor charged with responsibility for the design.

There has lately been an awakening to the importance of the better design and grouping of such buildings, and a number of plans have been made for such grouping, especially in the United States, many of which attain a degree of imposing dignity and even grandeur which at least equal anything heretofore accomplished. The greatest impetus in this direction was probably the object lesson given by the wonderfully effective arrangement of the principal buildings of the Chicago Exposition of 1893, which, as already noted, gave great stimulus to the modern city-planning movement, if, indeed, it did not start the movement, at least in America.

Some fine public buildings, admirably located, were to be found in the United States before this new interest developed, notable instances of which are the National Capitol at Wash-



Views of the Charles River water front of Boston before and after the creation of the Charles River basin. Reproduced from photographs kindly furnished by Mr. Hiram A. Miller, Chief Engineer of the Improvement (p. 145).

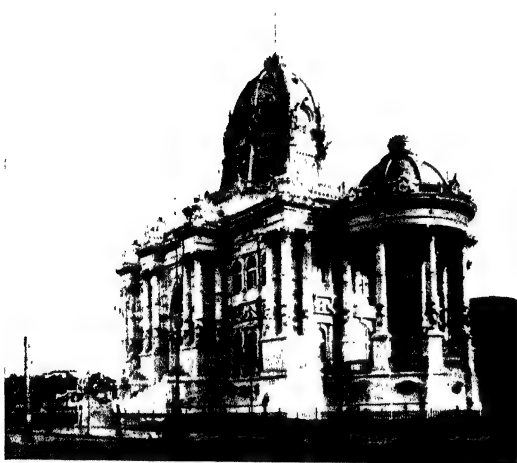
PLATE 27



The proposed grouping of public buildings in Washington, showing the Capitol in the distance. This and the view on Plate 28 are reproduced from photographs kindly furnished by the Commission of Fine Arts (pp. 151 and 168).



Showing the proposed grouping of public buildings in Washington. View looking west along the Mall pp 151 and 168).



The Monroë Palace on the water front of Rio de Janeiro. Reproduced from a photograph kindly furnished by Dr. E. L. Corthell (p. 153). See Pl. 7, p. 66.



Office building and freight house of the Delaware and Hudson R.R. Co., on the river front at Albany, N. Y. (p. 153).

ington and the City Hall in New York. The former was located in accordance with the plan of l'Enfant, but other public buildings, many of very poor design, were placed in a haphazard fashion in different parts of the city, apparently wherever a site to accommodate them could be acquired, and it is only within the last decade that a comprehensive scheme for their location has been worked out under the direction of a Congressional committee and the Fine Arts Commission, and it is gratifying to note that this plan follows quite closely the original l'Enfant scheme (Pls. 27 and 28). It is fortunate also that a much higher standard of architectural design for public buildings had been developed before this rearrangement was undertaken. In the case of the New York City Hall, this admirable two-story building was erected during the first decade of the nineteenth century in a triangular park, which has lately become an oasis in a district fast being given over to skyscrapers. The municipal authorities foolishly permitted the United States Post-office to be erected at the apex of this triangle, and then built a large court house directly in the rear of the City Hall. Both of these buildings are of poor design and, while the City Hall itself has been jealously preserved, its setting has been spoiled. Efforts are now being made to secure the removal of the Post-office building, while a new court house on a different site is about to be built, and it seems likely that this little park will be restored to its original purpose, a fitting site for one of the best, if not the very best, city hall in the United States.

While important public buildings in Continental Europe are generally of good design and occupy interesting and picturesque sites, the average buildings of this kind in Great Britain and the United States have been of inferior design and are poorly located. In the case of the Römer, of Frankfurt, additional units of a design harmonizing with the ancient building have been added from time to time to meet the need of more space, and the result is admirable. Such buildings have been better designed in recent years, but the gridiron plan of most cities in the western world does not permit them to be seen to advantage.

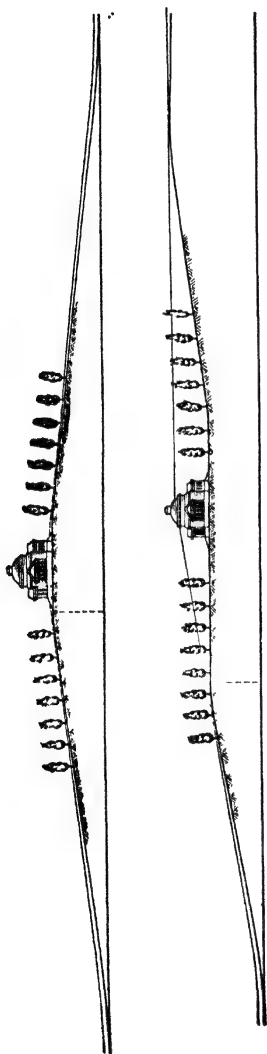


FIG. 37.—Illustrating the proper and improper location of an important building with respect to the grades of the streets approaching it.

Where a city occupies level ground, monumental buildings can only be seen to advantage if they are approached by streets of adequate width affording a view of them from a distance. Where the site is hilly or undulating such buildings should, if possible, be placed at the grade summits. Fig. 37 shows the great advantage of such a location and the unfortunate effect of misplacing a monumental structure with respect to the grades of the approaches to it. An admirable example of an advantageous location is that of the Arc de Triomphe in Paris at the summit of a hill with twelve avenues leading to it, while the Château at Versailles, which is so far back of the grade summit that only the upper part of the building can be seen by one approaching it from the gardens, is obviously misplaced. The great Palais de Justice in Brussels occupies a commanding site on a hill and can be seen

from nearly all parts of the city, although there are no great avenues leading directly to it. The water front sometimes affords an excellent site for a public building in cases where a purely commercial development does not crowd too closely upon it. A good example is the Palace Monroe at one end of the water-front boulevard at Rio de Janeiro (Pl. 29, p. 151). At Albany, N. Y., a railroad company has erected an office building with a freight station adjoining it along the river front in such a position that the tower surmounting it, the design of which is suggestive of the Dutch settlement of the town, is on the axis of the broad street leading from the State Capitol building, and the impression given to one entering the city from across the river is very pleasing (Pl. 29, p. 151). While it is not a building, it may not be out of place to refer in this connection to the Brühl Terrace in Dresden, a sort of grandstand overlooking the river, which, as elsewhere noted, has been called "the Balcony of Europe."

The huge City Hall of Philadelphia is 486 ft. 6 in. long and 470 ft. wide, with an inner court 220 by 200 feet, and was erected at a cost of more than \$18,000,000, exclusive of fittings and furnishings. The centers of each of the four sides are pierced by arches 18 ft. wide and 36 ft. high, affording access for pedestrians to and across the central court on the lines of the two intersecting streets which lead directly to it. It is located on the axes of Broad and Market streets, the former 113 ft. and the latter 100 ft. in width and, while portions of the façades can be seen from great distances on these streets, the remainder of the structure is surrounded by large buildings grouped closely about it, one of which is the Pennsylvania Railroad Station. A great parkway is now being constructed which will approach the City Hall obliquely, its axis passing directly through the Penn statue, which surmounts the great tower of the building, rising to a height of 584 ft. above the level of the sidewalk (Pl. 44, p. 174).

The new Public Library building of New York, erected at a cost of about \$10,000,000, occupies one end of a small park, with a frontage of 460 ft. on Fifth avenue, and its beautiful

façade can nowhere be seen to advantage. The illustration on Pl. 30 shows the best view of this building which is obtainable, and it is obvious what has been lost through this poor location. Had a little more of the park been given up to this monu-

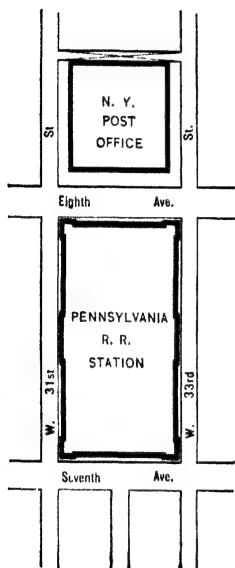


FIG. 38.—Showing the location of the Pennsylvania R.R. Station and the new Post Office, New York, with respect to the street system.

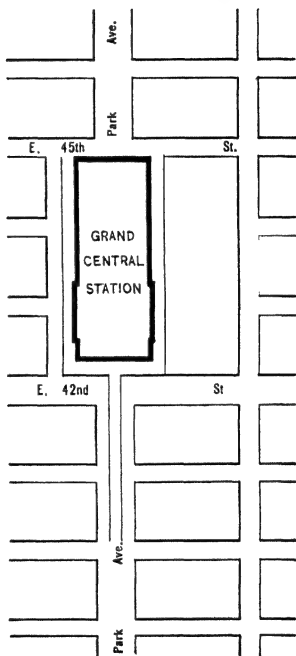
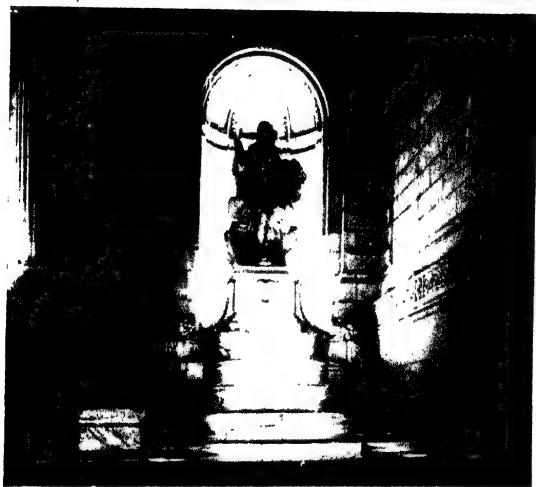
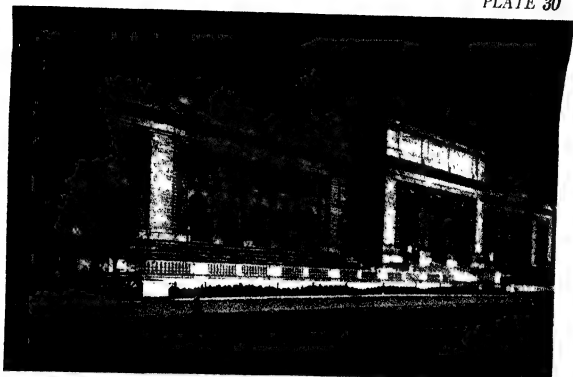


FIG. 39.—Showing the location of the Grand Central Station, New York, with respect to the street system.

mental building, so that it could have been set back even 100 ft. further from the line of Fifth avenue, it would have been much more effective.

In Continental Europe, especially in Germany, the important railway stations are treated as gateways to the cities and front



The New York Public Library at night a very beautiful and costly building which cannot be seen to advantage owing to the rectangular street system. The lower view shows the effectiveness of the indirect lighting system in the front of the building. Both are reproduced from photographs kindly furnished by the New York Edison Co. (p. 154)



View of the Grand Central Terminal, New York, in 1906 before the introduction of electrical operation. This and the views on Pls 32, 33 and 34 are reproduced from photographs kindly furnished by Mr Geo. A. Harwood, Chief Engineer, Electric Zone Improvement, N Y Central R R (p. 153).



Two Views of the Grand Central Terminal after reconstruction and the abandonment of steam operation. The upper view is taken from almost the same point as that shown on Pl. 31 (p. 155).



View looking north along Park avenue from the new Grand Central Station. The spaces above the tracks, now left open, will in a few years be covered with buildings (p. 155).

upon generous open spaces, while the railway terminals of London, New York, Chicago and St. Louis and other British and American cities are usually so hedged about by solid blocks of buildings that no satisfying view of them can be obtained. Even the beautiful Pennsylvania Railroad Station in New York, occupying two city blocks and what was formerly an intervening street, with an area of more than eight and one-third acres, cannot be appreciated (Fig. 38, p. 154). The new Grand Central Terminal of the New York Central Lines is more fortunately located in that it is centrally placed with respect to the axis of Park avenue, 140 ft. wide, and the central part of the principal façade, crowned by a large piece of sculpture typifying Transportation, can be seen from a long distance down this avenue (Fig. 39, p. 154). This station affords a striking example of the effect of electrical operation upon railway terminals. When operated by steam it was a noisy, unsightly intrusion into one of the busiest and most attractive parts of the city. The locomotives of arriving and departing trains and those used for switching constantly emitted smoke and steam and occupied a space some 350 ft. in width at its southerly end, while eleven cross streets and one important avenue were interrupted by it, causing long detours to traffic and effectually separating the districts on either side, so that movements of the police and fire-fighting forces from one side to the other were greatly interfered with. When electricity was substituted for steam as motive power, the tracks were depressed, so that all of the interrupted streets were carried over them with grades that in no place exceeded four per cent, and these but for short distances, while the terminal was at the same time greatly enlarged, its width being increased to 817 ft., and provision was made for the accommodation of local trains below the main track level. The contrast between the old and the new conditions is shown by the views (Pls. 31, 32, 33 and 34, pp. 154, 155 and 158), and the arrangement of the tracks is indicated by Figs. 40 and 41. When this improvement was commenced the full possibility of using the space above an electrically operated terminal was not realized. Several

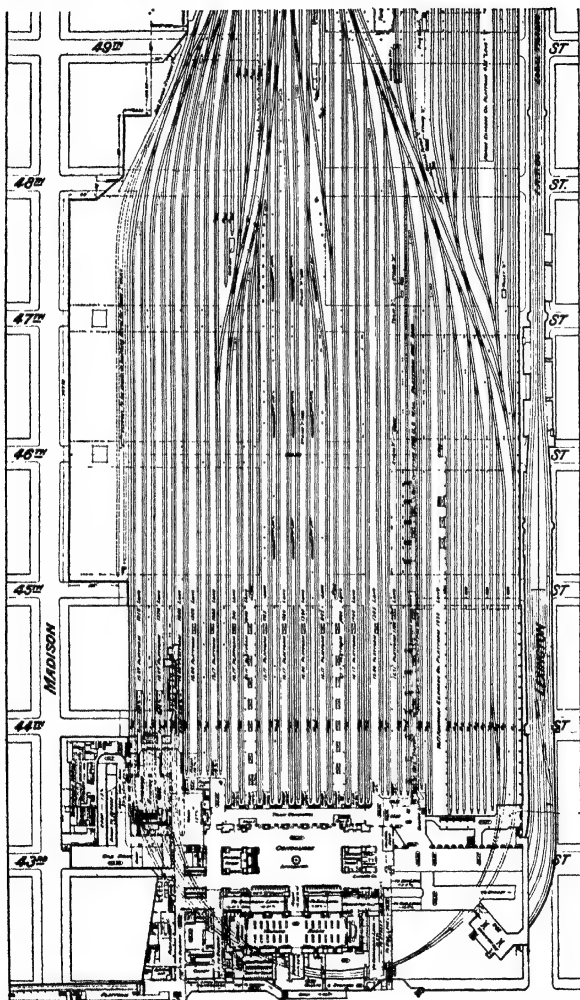


FIG. 40.—Plan of the upper or express track level of the Grand Central Terminal, New York. This and Fig. 41 are reproduced from plans furnished by the N. Y. Central R.R. Co.

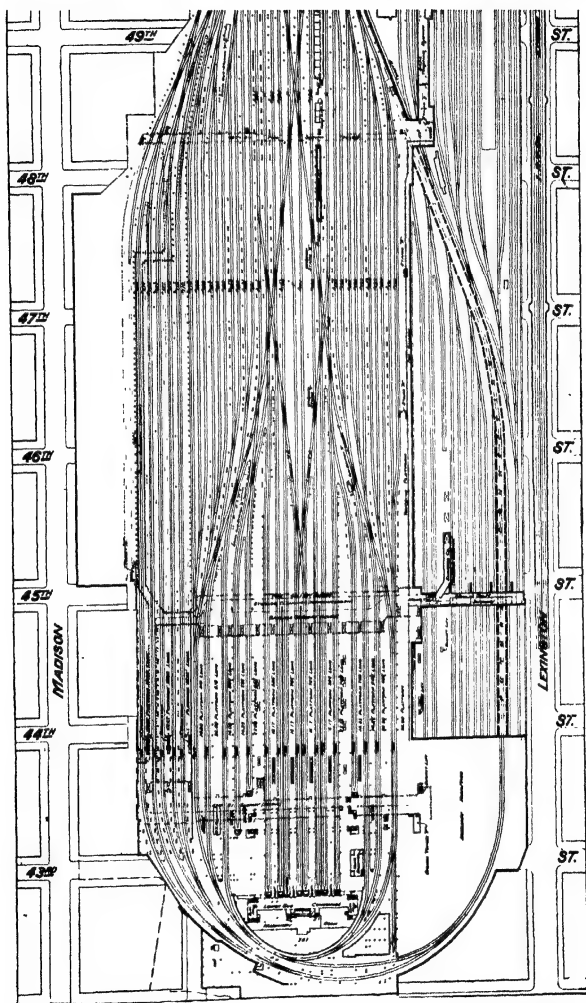
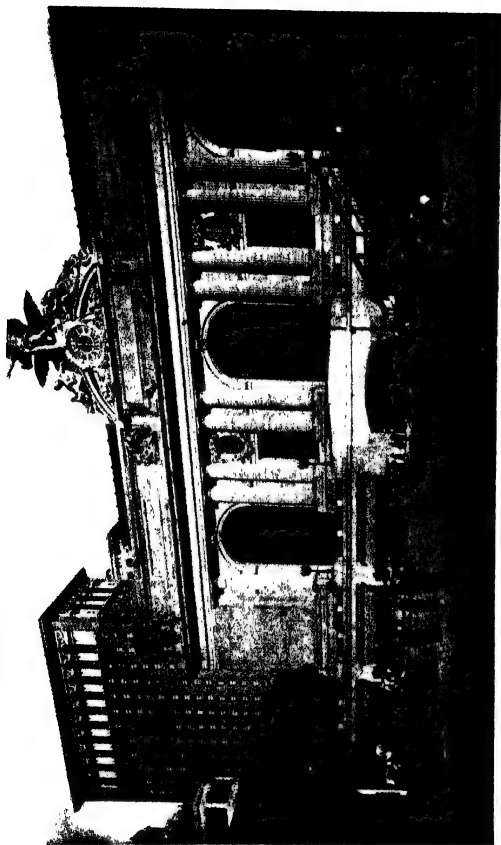


FIG. 41.—Plan of the lower or suburban track level of the Grand Central Terminal, New York.

large and important buildings have already been erected over the tracks, and it is now apparent that all of this enormously valuable space over what was formerly a railway yard in the very heart of a great city will be available for profitable use, and that the revenue derived from it will go far toward meeting the interest on the immense cost of this undertaking, which, with the station building itself, has considerably exceeded \$50,000,000.

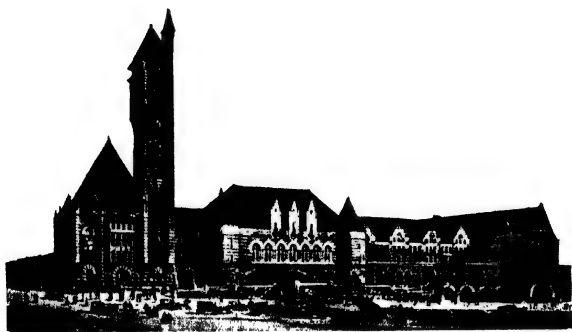
Park avenue is to be carried around the station building on an elevated platform, so that its central portion can pass over Forty-second street with a separation of grades on two very busy thoroughfares. With an appreciation of the importance of a dignified treatment in the vicinity of this terminal not often recognized by railway corporations, this company has declared its intention of restricting the height of the fronts of the buildings over its tracks along Park avenue north of the station to a height corresponding with the cornice line of the station building itself, so that this portion of the avenue is destined to become one of the most beautiful and dignified streets to be found in this or any other city. The Union Railway Station in Washington (Pl. 35 and Fig. 42, p. 159), is not only a very beautiful building, but it fronts upon an open space larger than any other "station place" known to the author and in close proximity to the capitol building. The location of the great railway station of St. Louis (Pl. 35, p. 159), surrounded by narrow streets, suffers greatly by comparison, as do the railway stations of Chicago, including even the latest and finest—that of the Chicago and Northwestern Railway. London's great railway terminals are inadequately provided with approaches, and have no open spaces worthy of the name in front of them. The Liverpool Street Station, through which it is said that more people pass daily than through any other railway terminal, is particularly ill-provided with spaces about or approaches to it. In Edinburgh, on the other hand, the two great stations, the North British, and the Caledonian, are located one at each end of the beautiful gardens along Princes Street. The British and some of the Continental stations have their ugliness screened by the railway hotels owned



The Forty-second street front of the Grand Central Station, New York (p 155).



The Union Railway Station at Washington, admirably located as one of a group of great public buildings. See Fig 42 (p. 158)



The Union Station at St. Louis, a large and handsome structure, so shut in by surrounding buildings that no satisfactory view of it can be obtained (p. 158).

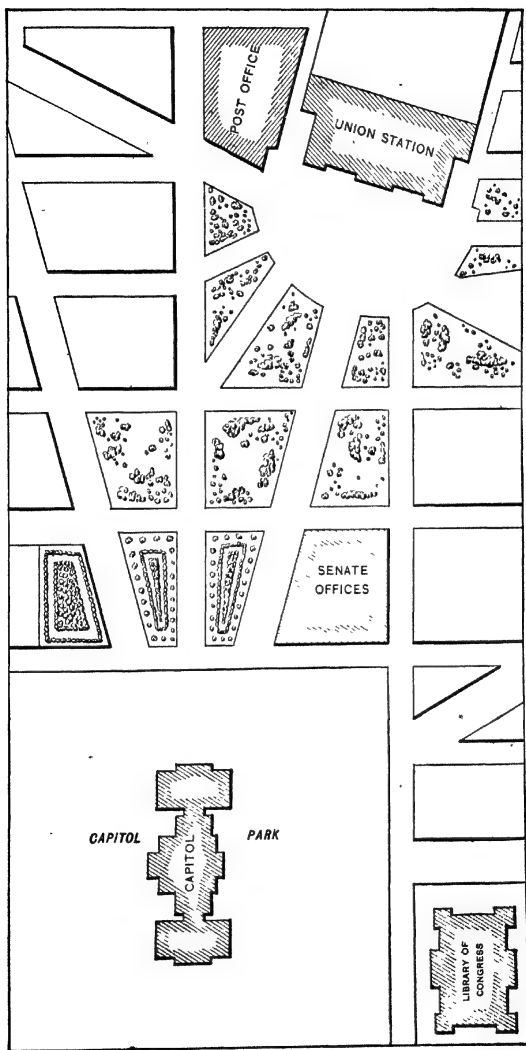


FIG. 42.—Location of Union Station, Washington, with generous open space in front, and forming one of a group of monumental public buildings (p. 158).

and operated by the companies, although behind them are to be found the inevitable train sheds, with their smoke and noise. Many of the German cities have erected large and handsome railway stations and have provided liberal open spaces in front of them from which broad avenues radiate, as in the case of the station at Frankfort, shown by Fig. 43. The principal railway station of Antwerp has an admirable location

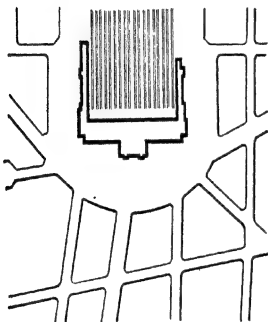


FIG. 43.—Showing the location of the principal railway station of Frankfort with open space and radiating streets.

and is approached by one of the most important streets in the city, but the design of the station building has been somewhat savagely criticised by Mr. Rey, who expresses his amazement at the blunder committed by the city in building what he calls a great "Palace of Smoke." He says that "no excuse can be found for its colossal arches, which serve no purpose and are merely the result of fanciful calculations on the part of the engineer. . . . It is

ridiculous to erect gigantic arches in grotesque imitation of cathedral naves for the purpose of sheltering trains which, after all, consist of coaches and engines of a size proportionate to human beings, and for which simply covered platforms would amply suffice. No reasoning, no æsthetic beauty can excuse such methods unless it be the pleasure of wasting the resources of the State and of the municipalities."¹

There has been much criticism of the high buildings so frequently in evidence in American cities, and these structures have been erected almost exclusively as office buildings or by individuals or corporations in the belief or hope that they would be commercially profitable or would at least have sufficient

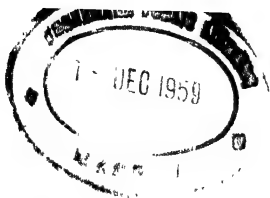
¹ Proceedings of London Town Planning Conference, 1910, page 279.

advertising value to justify themselves. What are called public buildings have been moderate in height and have conformed more closely with old established architectural traditions. New York City, however, has lately built a Municipal Office Building twenty-five stories in height, with a tower containing some fifteen additional stories, after designs made by McKim, Mead & White. It covers an entire block, or rather two irregular blocks, as one street passes under it (Pl. 36, p. 162), and fronts upon the City Hall Park for a portion of its length, so that it does not shut off the light or air from other buildings. Diagonally across City Hall Park stands the Woolworth Building, fifty-seven stories in height, and the illustration on Pl. 37 (p. 162) shows these two buildings, the view of each of them being taken from the other. This Municipal Office Building accommodates some 6000 city employees, and has a total combined area on all floors of 1,250,000 sq. ft., with usable office space, including corridors, of 725,000 sq. ft. If 15 per cent be added to this area for utility space, a five-story building offering the same accommodation would cover 166,750 sq. ft., exclusive of light and air courts. These would probably amount to one-third more or one-fourth of the entire building plot, so that the site required to accommodate a five-story building with equal office space would have to be over 470 ft. square, or, if 200 ft. wide, it would have to be about 1111 ft. long. This building, owing to the peculiar shape of its site, has no courts, and every office is a front room with ample outside light. As it is located over an underground railway station, the heating plant is placed beneath an open space at one corner, and the smokestack occupies a diagonally opposite corner in order to take advantage of the prevailing winds, while the fourth floor above the street level is given up to the accommodation of the complicated system of pipes, conduits and wiring incidental to a modern office building, and which are usually placed in basements or sub-basements.

Another instance in which New York is violating established precedent is in a new court-house which is about to be erected in accordance with plans made by Mr. Guy Lowell. This build-

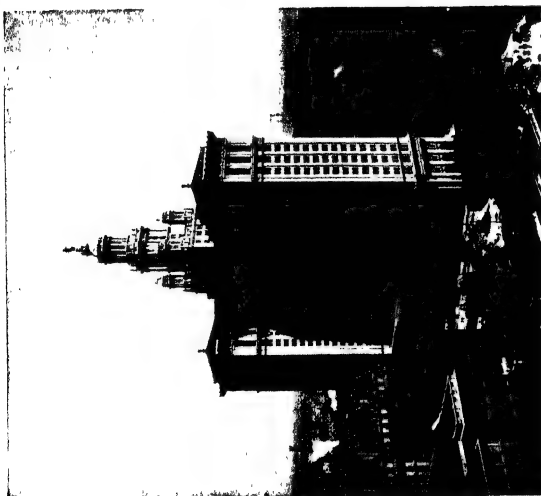
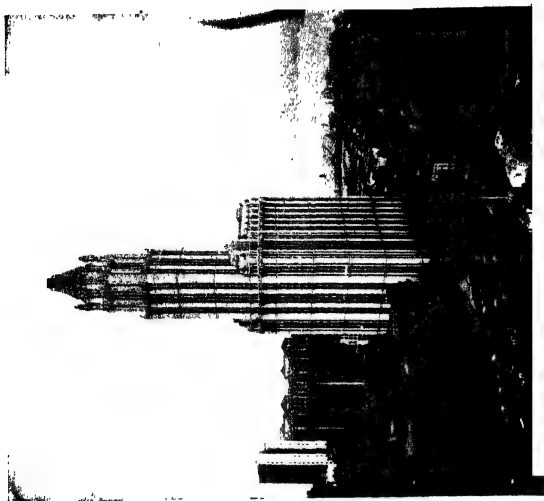
ing is to be circular, with a diameter of 386 ft. and a height of 204 ft. above the street, with eight stories on the front and thirteen stories on the central court (Pl. 38). A site was chosen and acquired which located the center of the building on the axis of an important street and over a four-track underground rapid-transit railroad. Owing to the existence of an old pond which originally covered this site and on account of the difficulty of spanning the underground railroad, it is now proposed to change the location somewhat and additional land has been acquired for this purpose. The court-house site, which is supposed to be large enough to accommodate some other public buildings and also provide bounding streets, will be in close proximity to the City Hall Park and the Municipal Office Building, thus forming a somewhat irregular civic center. It has also been suggested that a new broad avenue be cut through from this center to the approach to one of the great East River bridges. The present plan for the general treatment of this area is shown by Fig. 44 (p. 163). It will be observed that none of the streets approaching the great circular courthouse are radial to it, but all are approximately tangential; owing to the circular form of the building the views of it which will be presented from these streets may be more satisfactory than would be the case were it rectangular in shape, but the proposed arrangement appears to be unfortunate.

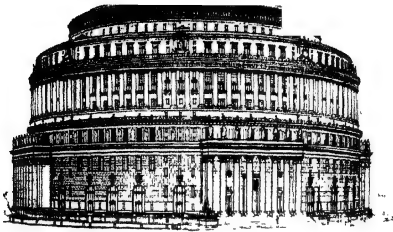
The effective grouping of public buildings to create civic centers has received much attention of late, so much so that it appears to have become a passion in American cities. Numerous towns, great and small, and many villages are now studying this problem. Many of these projects will never pass beyond the stage of studies, but one of the first to be undertaken, that at Cleveland, is being carried out and has been in large part completed, about \$15,000,000 having already been expended for land, improvements and buildings. It was particularly fortunate in this case that the principal railway station, located on the lake front, could be made a part of the plan, which comprises a rectangle 570 ft. in width and nearly 2000 ft. in length



The Municipal Office Building in New York, built over a street 60 ft. wide.
Reproduced from photograph kindly furnished by the Department of Bridges,
under the jurisdiction of which the building was erected (p. 161).

PLATE 37

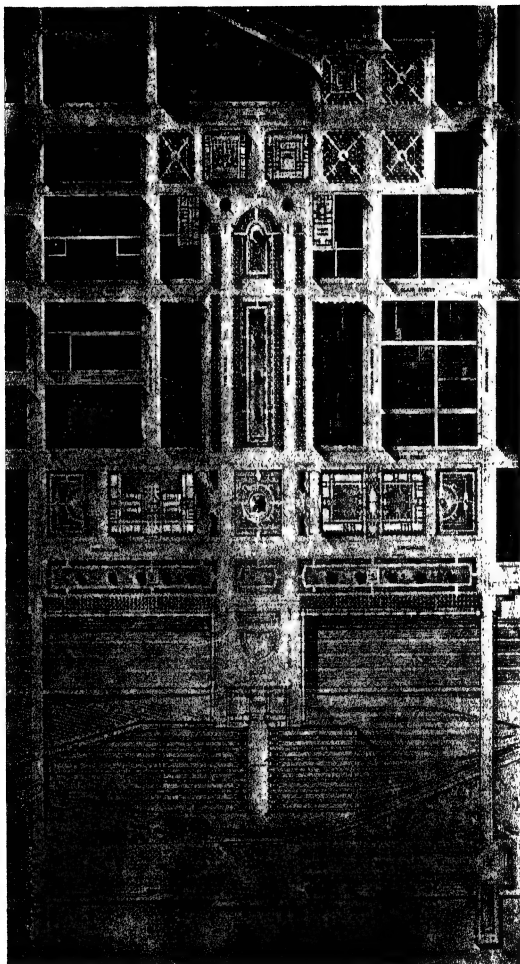




The proposed circular Court House for New York, designed by Mr. Guy Lowell. Reproduced from photograph furnished by the Court House Board. See Fig 44 (p 162).



The group of public buildings constituting the civic center of Springfield, Mass. Reproduced from photograph furnished by Mr. Kurt R. Sternal (p. 104).



The Cleveland group plan. Reproduced from the report of the Group Plan Commission (p. 163).

(Pl. 39). At the northerly end of the rectangle the County Court House and the City Hall, one on each side and set slightly

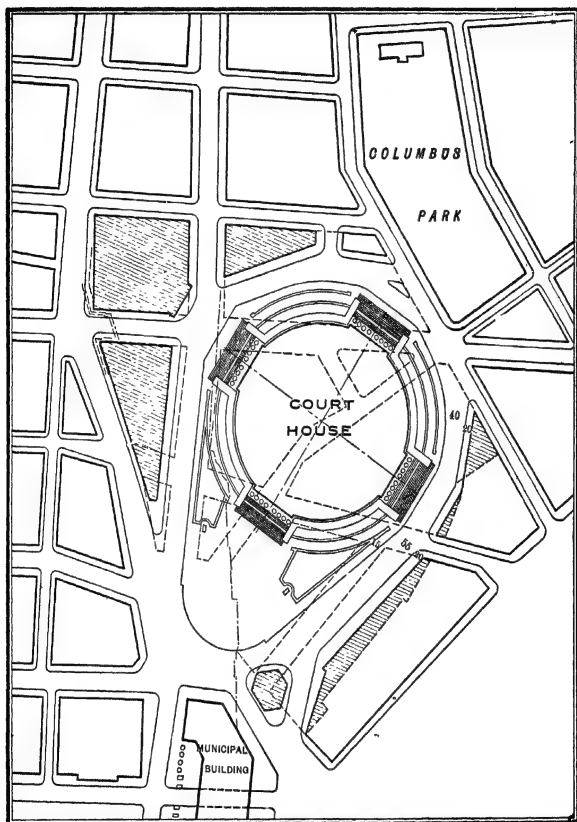


FIG. 44.—Plan showing the site of the proposed new Court House, New York, and the additional property (shaded) taken in connection therewith.

back from the sides of the rectangle, will balance the composition. These buildings are of classical design, and to the north of them and forming the northerly boundary of the rectangle

will be placed the new Union passenger station, the gateway to the city. The Federal building is placed at the southerly end of the Mall and its companion or twin building is to be the Public Library, while along the sides of the Mall are to be arranged other public and semi-public buildings of the future. The Federal building, the County Court House and the City Hall have been completed. The greater part of the ground for the Mall has been acquired and negotiations between the city and the railroad company have been concluded, so that the erection of the new station is soon to be commenced. The amount of land required for the group plan proper is about 41 acres, while the complete scheme embraces 53 acres of the made land on the lake front besides Lakeview Park of 10 acres, a total of over 100 acres in the heart of a thickly populated city. The Cleveland Group Plan Commission was originally composed of Messrs. Daniel H. Burnham, John M. Carrère and Arnold W. Brunner, and their first report was made in 1903. Messrs. Burnham and Carrère have since died and have been succeeded by Messrs. Frederick Law Olmsted and Frank B. Meade.

One of the very first group plans to be carried to completion is that of Springfield, Mass. It is much less extensive than that of Cleveland, consisting of two buildings with a bell tower between them. In this tower are chimes of bells and a professional chime-ringer is regularly employed by the city (Pl. 38, p. 163).

The city of San Francisco is carrying out and has already completed a part of an effective scheme for the grouping of its most important public buildings (Fig. 45). This was described in some detail in the *Engineering Record* of October 31, 1914. The conspicuous feature of the plan is its adaptation to the previously existing street system. The former triangular site of the city hall is devoted partly to sites for new buildings and partly to a broad approach. Four city blocks are given up to a plaza about which the buildings are grouped, while the site of the new city hall covers four additional blocks. The City Hall itself, which dominates the group, is a huge building 300 ft. by 400 ft. in size, surmounted by a dome 110 ft. in

diameter, the top of which is 300 ft. above the street level, this building fronting one of the long sides of the plaza (Pl. 40, p. 166). Opposite one end of the plaza is a great auditorium building 265 ft. by 402 ft. in size, containing an octagonal main hall 200 ft. in diameter, with seating capacity for 5000 persons, besides a large free space, while 5000 more can be seated in the balcony.

Opposite the auditorium is to be located a state building while the side of the plaza opposite the city hall is being set

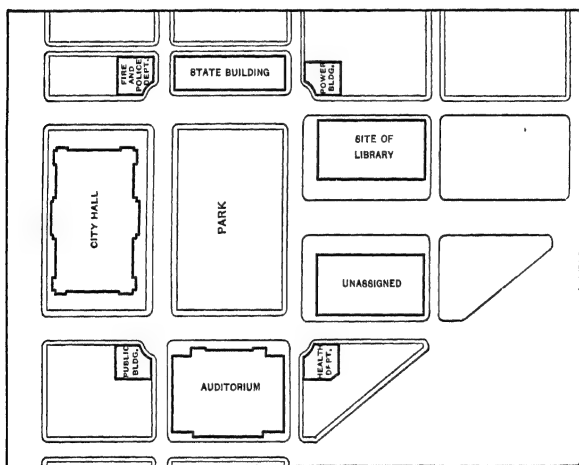
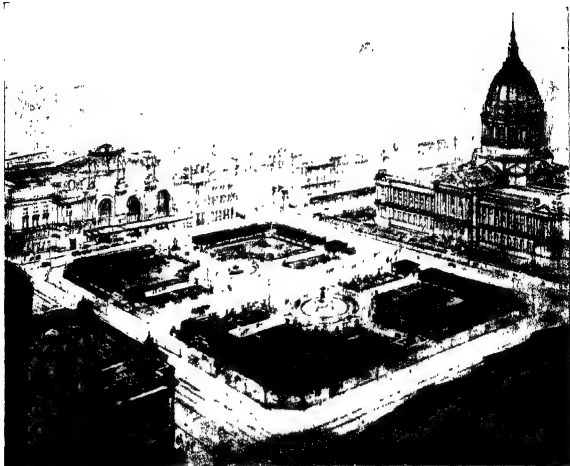


FIG. 45.—Plan of the San Francisco Civic Center. Reproduced from plan kindly furnished by Mr. M. M. O'Shaughnessy, City Engineer.

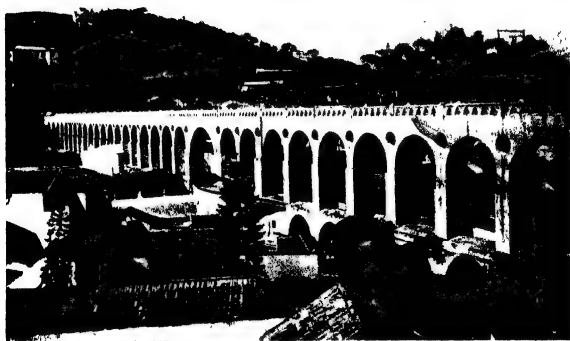
aside as a site for a library and for some other building, the use of which is not yet determined, and opposite the four corners of the plaza are to be four minor public buildings. The city hall dome will be on the axis of broad streets approaching it from either direction. While San Francisco after the great fire of 1906 seriously considered a general replanning of the burned area, it was found to be impossible to perfect such plans before a general reconstruction took place on the old lines, and when

the property was acquired for this new civic center a number of buildings which had been erected after the fire and while the plans were under consideration had to be destroyed. In accordance with the policy of direct legislation and the referendum, which are so popular in the western part of the United States, a bond issue of \$8,800,000 was authorized for the construction of these buildings, while the provision of funds for the state building was similarly authorized by the vote of the people at a general state election.

A comprehensive plan for the future development of Seattle, prepared for the Municipal Plans Commission of that city by Mr. Virgil G. Bogue, while especially conspicuous for its far-sighted provision for future commercial development, including rail and water terminals, and its provision for a park and boulevard system, included plans for an imposing civic center, the main approaches to which would be, one by a broad avenue from the north connecting the civic center with a plaza in front of a proposed new railway terminal, and another from the west, which, cutting diagonally across the present street system, would lead to the shore of Puget Sound, across which can be seen the peaks of the Olympic range. These plans have been rather harshly criticised by some who do not fancy the particular shape and dimensions of the civic center and who do not appear to appreciate the admirable features of the plan, especially those which are designed to promote the commercial development of the city. The plan was submitted to the people at a general election and failed of approval, which was, perhaps, fortunate, as the ordinance providing for its adoption contained the unusual and unwise provision that it could not be changed in any particular "until modified or amended at some subsequent election." Constant tinkering with and radical changes in a city plan by succeeding administrations are prejudicial to orderly growth and involve great waste of public funds, but no plan can be evolved that cannot be advantageously modified in some details, as circumstances or changing conditions indicate that it is desirable to do so. To require a referendum to the



View of San Francisco's civic center, the City Hall on the right, the Auditorium on the left. Reproduced from photograph furnished by Mr. M. M. O'Shaughnessy, City Engineer. See Fig. 45 (p. 165).



An old aqueduct in Rio de Janeiro, now used by an electric railroad. From a photograph furnished by Dr. E. L. Corthell (p. 173).

PLATE 41



Two examples of high school buildings recently erected in New York. The upper view shows the interior of a large quadrangle which will be entirely enclosed by the building. Reproduced from photographs furnished by Mr. C. B. J. Snyder, architect of both buildings (p. 170).

people of such details, when their verdict is likely to be controlled by a sudden prejudice or a spasm of extravagance on the one hand or economy on the other, is most unwise.

The aim of city planners and architects usually is to locate public buildings, whether isolated or in groups, so that each building shall be a single unit, even though it may bear a certain relation to others. Each building is given a site of its own, with due regard for those of its neighbors. There are those, however, and their opinion is entitled to the greatest respect, who strongly urge the avoidance of an appearance of isolation, even in buildings of the greatest importance, and who instance the charming effect of an apparently irregular "place" where really great buildings are seen to far better advantage when flanked by those of minor importance, or when even physically connected with them, and cases are cited where some small and relatively mean buildings have been removed and the result has proved so disappointing that they were subsequently replaced. The artistic judgment of these writers and critics will not be questioned, but these pages are frankly written from the viewpoint of the engineer, of the men who will largely control the general plan of the city, making it easy or difficult to select sites for public and semi-public buildings and without the costly and disheartening process of tearing down buildings and rearranging streets in order to provide such sites. If there are smaller structures on adjacent plots which will enhance the beauty of the more important buildings, they can remain; if necessary they can be built. If competent authorities decide that they should go, they can readily be removed. The small and shabby shops which cluster about Antwerp Cathedral are held by some to enhance its beauty, by others to detract from it. The Cathedral of St. Bovan, the Church of St. Nicholas and the old belfry in Ghent, each standing by itself, are said to suffer from their isolation, and this view is probably correct, but no city plan likely to be made today would contemplate such locations. It is difficult to imagine anything more pleasant in its simple dignity than the New England village green, with

the church, or churches, and the town hall placed either in it or fronting it. They are not connected with other buildings in order to secure a picturesque effect; each has its own site; they are in many respects isolated, yet the impression they create is a very satisfactory one.

Probably no such extensive grouping of monumental public buildings has ever been planned or undertaken as is proposed for Washington. Each one of these buildings is given a spacious site, so that it can be seen to advantage. Pls. 27 and 28 (pp. 150 and 151) show the plan of the Park Commission for their arrangement. The distance from the Capitol to the Lincoln Memorial on the bank of the Potomac is about two miles. Along the easterly two-thirds of this distance, or between the Washington Monument and the Capitol, the new public buildings will be grouped, while the other one-third will be a beautiful park. There will be no striving after picturesque effects by placing one great building where it will show to advantage by contrast with smaller ones. While there will be sufficient harmony in their design and treatment to give a pleasing effect, each will stand by itself and be worthy of its setting. This allowance of spacious sites is a conspicuous characteristic of the public buildings of Washington, from the Capitol itself to the railway station, from the White House to the Senate and House office buildings, and it is consequently difficult to appreciate their great size. The Lincoln Memorial, which is now being erected after plans by Mr. Henry Bacon, is said to be the costliest monument to the memory of one man ever reared by a republic. It will stand on a terrace 45 ft. high, will be in the form of a temple 188 ft. long and 118 ft. wide, and will contain 36 columns 44 ft. high and more than 7 ft. in diameter at the base. In the central hall, which will be 70 ft. long, 60 ft. wide and 60 ft. high, will be placed the statue of Lincoln.

The grouping of public buildings is advantageous in that it will permit the concentration of public business and facilitate the conduct of inter-departmental affairs, in addition to which such grouping will give an added dignity to the city and make

a favorable impression upon visitors. This is especially true of cities of moderate size or those of several hundred thousand population. In very large cities there is a tendency toward decentralization, which is really the fundamental idea back of the so-called Garden City movement, and the location of all public buildings in one group, while it may be convenient as to administration, is likely to involve congestion and annoyance to many of those who have business with the various departments of the city government. A grand climax may be all right in a city of a quarter of a million people, but when it becomes a city of several millions there is not only need of sub-centers for public convenience, but such sub-centers will add greatly to the interest and attractiveness of a large town. The segregation of places of amusement, such as theatres, has some advantages, in that, if one is unable to secure seats at one place of entertainment, he can probably be accommodated at another within a few minutes' walk; but such segregation involves long and tiresome journeys for many of those who wish to patronize the theatres or other places of amusement and is likely to result in serious congestion of traffic.

There are many minor public buildings—far greater in number than those which are likely to be grouped in a civic center—which are commonly located in a haphazard fashion wherever the most available or the cheapest property can be acquired for them at the time they are erected. These buildings are of two classes, to which different kinds of location are best suited. In one class are schools of various grades, branch libraries, public baths, etc., which need not be and should not be on main traffic streets. Their location will depend to a large degree upon the distribution of population, but, if certain blocks in different parts of the city were set aside for them, several could be grouped together and designed in harmony with each other with sufficient space about them to insure abundant light and air and with room for future additions, space for which, until needed, might well be devoted to playgrounds. Such a block would be peculiarly well suited to the purpose if

the street system about it were sufficiently irregular not to invite traffic. The other class would include such buildings as police stations, fire-engine houses, repair shops, municipal garages or stables, and buildings of this character. These could also be designed to harmonize with each other and form consistent groups. They would naturally be located on or in close proximity to the more important thoroughfares, in order that the territory which they serve may be easily reached. In either case such municipal blocks would be creditable to the city, while the problem of heating, maintaining and caring for them would be greatly simplified.

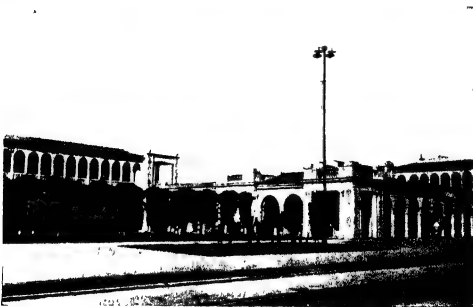
Some of our modern school buildings are so large and well designed that they are especially worthy of a good site. One of the High School buildings in New York occupies a site about 300 ft. in width and about 650 ft. in depth, the latter dimension extending entirely through the block in which it is located; but on both sides it is closely hemmed in by dwellings and shops. It has one unusual advantage, however, in that its large site permitted it to be built in the form of a quadrangle with an inner court which will be about 200 by 500 ft. in size. The front and part of the sides of this quadrangle have been completed and the entire plan will be carried out in time. Another High School still has ample space about the building, and it is to be hoped that other detached structures devoted to some municipal purpose will be grouped about it (Pl. 41, p. 167). While an effort is usually made to adapt dwellings to climate and environment, little attention is usually paid to these considerations in the location and design of public buildings. One of the best, if most modest efforts, to do so is that of the fire-engine house in Portland, Oregon, one of the buildings shown on Pl. 42. This fire-engine house is located in a residential district and its design is similar to that of the dwellings in the immediate neighborhood. The Post-Office building in Santa Barbara is also quite different from the usual type of post-office to be found through the country, and is more in harmony with the prevailing architecture in the locality, while in



A fire-engine house in the bungalow section of Portland, Ore. (p. 170).



Entrance to the Santa Fe Railroad Station at San Diego, Cal. (p. 171).



The railroad station at Barstow in the California desert (p. 171).



View of the Plaza at the main entrance to Prospect Park, Brooklyn, showing the Mt. Prospect water-tower. In the triangular space in front of this tower, which should have been kept open, a huge public library is being built. Reproduced from photograph furnished by the Brooklyn Park Department (p. 171).

the two railway stations, the one at San Diego and the other at Barstow, the mission type of architecture, so generally found in California, has been successfully used (Pl. 42).

Arches, monuments, and fountains are supposed to be for purposes of adornment and should, therefore, be placed where they can be seen to advantage; but this, unfortunately, is not always done. In Paris there are many instances of the admirable location of such structures. The Brandenburg Gate across Unter den Linden at the entrance to the Berlin Tiergarten is another. The Washington Arch forms an impressive terminal at the lower end of Fifth avenue in New York, but cannot be seen to advantage for any distance from the south. A Soldiers' and Sailors' Memorial Arch has been erected at the main entrance to Prospect Park in Brooklyn, and although several important streets converge at the plaza in front of this entrance, the arch appears to have been deliberately located off the axis of every one of these streets, and its effect is thereby lost. This same locality affords another illustration of a misplaced public building now in course of erection. Immediately in front of the high-service reservoir, which is flanked by a lofty water tower of admirable design, and in a triangular space between the reservoir and two very important streets, a space that should by all means have been kept open, a huge public library is being built (Pl. 43). The unsuitability of this location was pointed out at the time the site was under discussion, and Mr. Frederick L. Olmsted, among others, urged that the proper place for this building was on the northerly side of Eastern Parkway, where it would form an admirable balance for the dignified Park entrance; but these protests were disregarded. This is especially to be regretted in view of the fact that the introduction of a new water-supply system will soon make it possible to dispense with the high-service reservoir, the space occupied by which would make an admirable site for an important public building, the library itself, an art museum or some educational institution. The reservoir occupies the highest ground in this part of the city, and would form an Acropolis worthy of a Parthenon. Phila-

delphia is doing this very thing that New York failed to do. Its new Fairmount Parkway is to extend from the City Hall to a point on the banks of the Schuylkill River occupied by a reservoir which has now been abandoned. On this reservoir site, at an elevation above the surrounding streets, is to be placed a fine-arts museum closing the vista from the City Hall along this parkway, while in front of the museum building is to be a plaza, fronting which will be an impressive group of buildings devoted to art and educational purposes (Pl. 44, p. 174).

There are no structures other than great public buildings which attract more attention and the location and design of which are of greater importance than bridges. As bridges are parts of highways their position will largely be controlled by the street system, while the material of which they are built, their weight and design will necessarily be governed by the character of the foundations, the kind of traffic which is to pass over and under them, the topography of the site and considerations of cost. Probably no greater, more costly, or more dignified bridges have been built in any city than those across the East River in New York, and the most beautiful of them is the one which was built first—the Brooklyn Bridge. Its towers are of stone masonry, of simple but excellent design. In the later bridges, two of which are suspension and one a cantilever, steel towers were used for reasons of economy and to permit greater rapidity of construction, and the bridges necessarily lose a certain amount of massiveness and dignity in their general effect. In the case of these later bridges one might have thought that they were erected merely for the sake of building a bridge, as the structures themselves were completed many months before suitable approaches were provided, during which period the public was unable to enjoy other than a very restricted use of them. In fact, the question of their approaches was not seriously taken up until the bridges themselves were nearing completion, although, if the idea that a bridge is part of a highway is correct, intelligent planning would dictate the determina-

tion of the approaches to and connections with a bridge as a part of the original plan. No one feature of Paris is more impressive than the bridges across the Seine, the beautiful Alexandre III bridge being one of the most notable structures of its size in the world. Those of London and Berlin are also interesting and dignified, while the Cambridge Bridge at Boston is a great addition to the monumental structures of the metropolitan district of which the Massachusetts State House is the center (Pl. 45, p. 174); but none of them approach in size those over the East River.

The aqueducts of many of the ancient cities, though mere ruins, still attest the high level reached by the engineers and architects of those days in the design of their public structures. None of the bridges about New York is more beautiful than High Bridge (Pl. 46, p. 175), which was built as an aqueduct to bring the Croton water supply into the city; as a bridge it provides only for pedestrians and has no roadway for vehicles. A little to the north is the Washington Bridge, a monumental structure, one of its two great arches spanning the Harlem River and the other the tracks of the New York Central Railroad (Pl. 47, p. 175). Two arches, one spanning a river and the other land, present a difficult problem, yet the designer of this bridge appears to have solved it successfully. An old aqueduct in Rio de Janeiro is now used as a bridge for an electric railway, and is one of the picturesque features of that city (Pl. 40, p. 166).

The city has to build and maintain within its limits mechanical plants such as pumping stations, refuse destructors, and sewage disposal works, which the residents of the district in which they may be located are likely to regard as more or less of a nuisance, and the location of which in their neighborhood they vigorously oppose, thinking that it will inevitably mean smoke, noise, bad odors and unsightliness, with a consequent depreciation of property values. This feeling is not unnatural and is fully justified by the manner in which such plants have been commonly designed, built and operated.

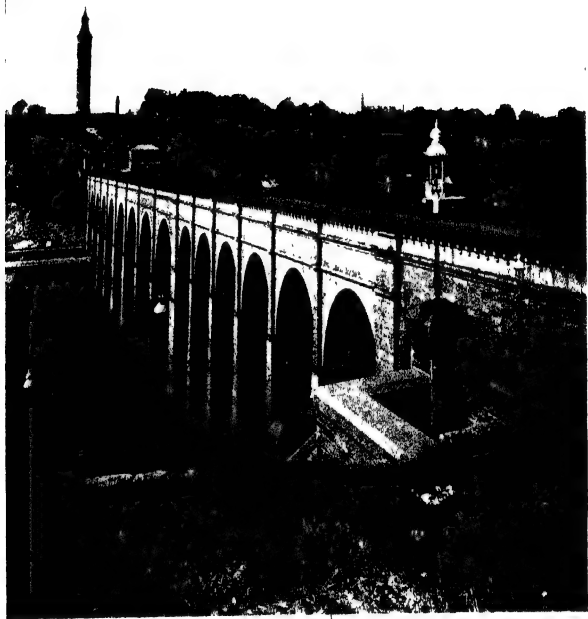
It has been found possible, however, to eliminate almost entirely these objectionable features. Reservoirs and pumping stations for water supply are now quite generally built so that they are actually an ornament to the city, as witness the Chestnut Hill Reservoir of Boston, and the pumping stations of Detroit and Chicago. The sewage pumping station on the waterfront of Rio de Janeiro is not at all objectionable, and even sewage-treatment plants can be made inoffensive and even attractive, as has been done at Essen-Nord, where such a plant is located in a well-populated district, and it is said that there is no complaint of nuisance from it (Pl. 48, p. 178). A chimney of a lighting plant in Dresden has been so designed that it might be taken for an ornamental tower, while in this same city the difficult problem of mitigating the ugliness of a gas holder appears to have been accomplished, not by covering it with aluminum coating, but by enclosing it in a rather attractive concrete structure. Even when the city has to erect structures far beyond its limits it is now generally agreed that they should be designed with some regard to their appearance, and that they should be in some way typical and worthy of the city which they serve. The design of the Kensico Dam and the treatment of its surroundings illustrate this tendency. (See Pl. 24, p. 146). Up in the Catskill Mountains, 100 miles from the city, where New York has built a great reservoir, the aerating of the water before it begins its long journey through the aqueduct to the city, has so been done as to provide a beautiful group of fountains (Pl. 49, p. 179). At the head of this reservoir the fine road which has been built around it is carried across a ravine by an attractive bridge shown in Pl. 50 (p. 190).



General plan of Fairmount Parkway now being constructed in Philadelphia with the City Hall at one end and a monumental building on an elevated site at the other. Reproduced from the report of the Bureau of Surveys of Philadelphia for 1911 (pp. 153 and 172).



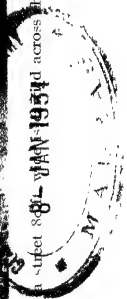
General plan of Fairmount Parkway now being constructed in Philadelphia with the City Hall at one end and a monumental building on an elevated site at the other. Reproduced from the report of the Bureau of Surveys of Philadelphia for 1911 (pp. 153 and 172).



High Bridge, New York, completed in 1843, is the aqueduct by which Croton water was first brought into the city. Persistent demands are now being made that one or two of the piers of this bridge be removed in the interest of navigation on the Harlem River. This and the view on Pl. 47 are reproduced from photographs furnished by the New York Department of Bridges (p. 173).



Washington Bridge, New York, by which a street 80 ft. across the Harlem River and the New York Central Rail-
road (p. 173).



CHAPTER IX

THE ECONOMIC VALUE OF A CITY PLAN

IT is very difficult to capitalize the advantages of any improvement or betterment which is for the free use and benefit of the general public. It may be possible to estimate the pecuniary loss suffered by individuals, by groups of individuals, or by corporations through delays and increased expenses which are due to a bad plan, but estimates of this kind should be subjected to careful scrutiny before conclusions are drawn from them. It has been said that figures do not lie, and yet we know that they can and often do lie outrageously. Statistics, if skilfully handled, can be made to prove almost anything. Estimates could be presented which have doubtless been made with care and have been published in entirely good faith, but they have been collected for the express purpose of proving something—something which we are all disposed to admit—but those who have made them have been so intent upon making a case that other contributing causes may have been lost sight of. Even if due allowance be made for such omissions, the preponderance of evidence is so great that the general conclusions must be admitted to be sound. It is quite obvious, for instance, that if goods are to be moved from one point to another, and if it is necessary in doing so to follow two sides of a triangle instead of travelling along the hypotenuse, there is a loss of time and an increase in cost; but to take a traffic census and apply that estimated loss to every load or ton which is hauled over the longer route under the assumption that each would have taken a more direct route were it available, might lead to a false conclusion. To compute the delays which occur to traffic and apply them to the hourly expense of a team and

driver and to argue that each team would have accomplished so much more during the working day is to neglect the personal equation of the driver and the improbability of his or his team's disposition or capacity for a sustained maximum effort during the entire working day.

When an attempt is made to estimate the value to the city or the State of the more robust and vigorous manhood and womanhood which would result from better living and working conditions, and the consequent saving in the annual budget for charities and the maintenance of order, we are again dealing with something which we know to be of enormous advantage, but which can scarcely be expressed in dollars and cents. Some estimates of this kind are worthy of serious consideration, but an effort should be made to avoid conclusions which are unwarranted or other than conservative.

It may not be possible to express the advantages of a good city or town plan in money. Mr. John Burns, who may be called the father of city planning legislation, has said that investment in a good plan, whether it be for new parts of a city or for the correction of older parts, if regarded for a period of a year, may appear expensive; if considered for a period of five years it will be profitable; when considered for a period of fifty years it will be an investment which in subsequent days will make the community regret that it did not adopt it sooner. Mr. Burns further notes that the neglected hamlets of a hundred years ago are the squalid industrial towns and cities of to-day, and he pleads that we should so arrange the physical life of a hamlet, village, town or city that it can grow naturally and at each stage avoid the cost, nuisance, ugliness, and squalor which one sees wherever a town encroaches on the country.

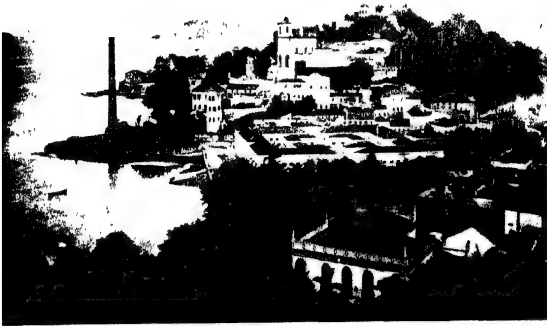
It is often urged that improvements designed to correct the obvious defects in a city plan be carried out at the general expense, a favorite argument being that the increased taxable values will more than provide for the interest and sinking fund charges on the debt which may be incurred for this purpose. This argument may be a sound one in specific cases, but it is

used so often and in connection with so many projects where the benefited districts would overlap that it should not be taken too seriously. If there is to be an increase in taxable values resulting from an expenditure of public funds, the entire public should reap the benefit due to such increased revenue from taxation, and the owners of the property thus enhanced in value could justly be assessed for any improvement which will result in peculiar benefit to them. But let us take a few specific cases. Central Park in New York was acquired and its improvement commenced in 1858. Up to the end of 1873 the city had invested in this project nearly fourteen millions of dollars, of which about five million dollars was for land, and nearly nine million dollars for improvements. Mr. Salem H. Wales, President of the Park Board in 1873, notes that during the period between the beginning of this undertaking and the year last named the average increase in values in other parts of the city had been about 100 per cent and, had this rate of increase been applied to the property within the three wards contiguous to Central Park its value in 1873 would have been about fifty-three millions of dollars, whereas it actually was two hundred and thirty-six million dollars, so that the increase for the period, instead of 100 per cent, as in other parts of the city, was nearly 800 per cent. The assumption that this increase was entirely due to the acquisition and development of this park would be unwarranted. As property changes from acreage to city lots the percentage of increase in value is greater than during any other period of development. Much of this advance in value may be speculative, but that there is a real increase due to the land having become marketable cannot be questioned. During the period covered by the increase in taxable values about Central Park, the great northward movement in population and improvement began, and there would undoubtedly have been a marked advance in value even if Central Park had not been bought and improved; but it is unreasonable to suppose that it would have been so great. If we cut the figures in two and conclude that values within these

three wards were quadrupled as a result of this improvement, it is likely that we would not be far wrong.

The practice of assessing at least part of the cost of acquiring new and the widening of existing streets is quite general in the United States, and the persistence of this policy when once begun and its adoption by cities which formerly paid the cost from general funds is conclusive evidence of its wisdom. The same practice could with propriety be applied to the acquisition of parks. In the case of Central Park about 32 per cent of the cost of acquiring it was assessed upon a large area of benefit (Fig. 46), while 38.5 per cent of the cost of acquiring Prospect Park, in Brooklyn, was similarly assessed (Fig. 47). The reason for not extending the area of benefit beyond one side of the park in the latter case was that the land on that side lay beyond the city limits, and assessments could not legally be imposed upon it. Leading from Prospect Park southwardly to the ocean through towns not then a part of the city and eastwardly to what was then the city line, parkways 210 ft. in width were laid out and improved, and the failure, for more than a generation, of the contiguous property to respond either in value or development to these improvements might be cited as instances to disprove the contention that city planning improvements have an actual and measurable money value. The absence of a marked increase in realty values along these parkways, however, was undoubtedly due to lack of transit facilities. They were of very great general, but of relatively small local benefit. Had the abutting property been put in touch with the rest of the city by adequate transit lines a marked enhancement of values would promptly have followed. The conclusion, therefore, must be that the planning was not complete; that attractive parkways were provided without adequate means of getting to or from them.

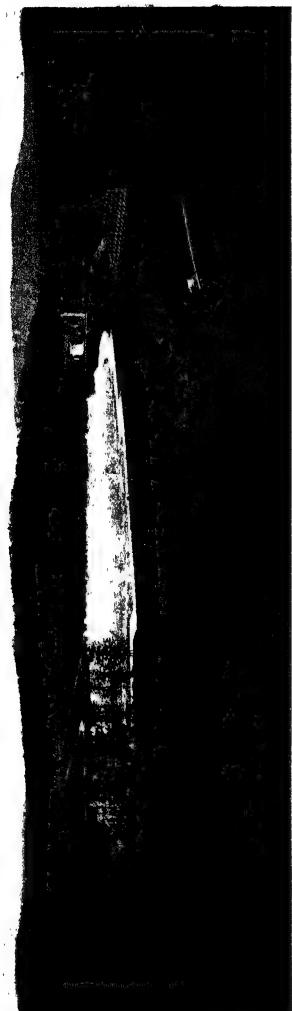
Kansas City has created a very complete system of parks and parkways (see Pl. 19), and, instead of incurring a debt and leaving the bill to be paid by posterity, the people of the city have felt so sure of their immediate value to the



A bit of the water front of Rio de Janeiro, showing a sewage pumping station.
From a photograph furnished by Dr. E. L. Corthell (p. 174).



A sewage treatment plant at Essen-Nord in a thickly populated district.
Reproduced from a photograph by Mr. Harold M. Lewis (p. 174).



The aerating fountains in front of the Ashokan Reservoir in the Catskills looking downward from the dam. By means of these fountains the water is aerated before passing into the aqueduct for its journey of 100 miles to New York City. This and the view on Pl. 50 are reproduced by courtesy of the Board of Water Supply of New York (p. 174).

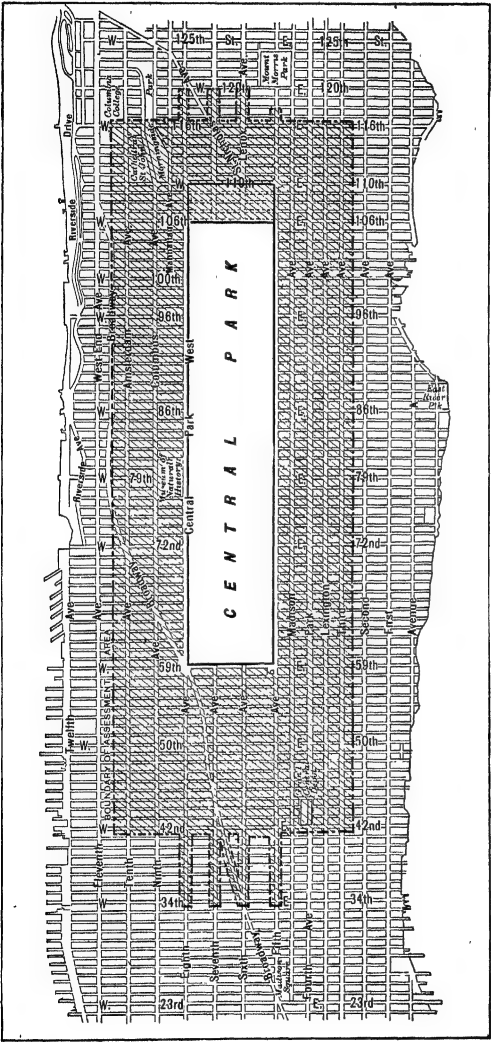


FIG. 46.—Showing the area (shaded) upon which was assessed 32 per cent of the cost of acquiring Central Park, New York.

according to the distance from the park or parkway acquired. From information kindly furnished by Mr. H. F. Meryweather, the City Engineer, it appears that in one district the assessments varied from \$2.98 for each lot 25 by 125 ft. in size near the parks to \$1.16 for the more remote lots. In another district they ran from \$5.09 to \$2.26 a lot, in a third from \$33 to 50 cents a lot, while in the fourth district, covering the central part of the city and containing the civic center where the expenditure for this purpose was nearly three million dollars, the assessments ran from \$1000 to \$3 a lot. The initial expenditure was provided for by the issue of fifteen-year bonds, the interest and amortization of which were met by fifteen annual assessments upon the property in each district. The cost of grading, curbing and paving the parkways was also met by local assessments imposed in decreasing amount upon the property lying within 750 ft. of each of the parkways.

Instances may be cited where towns have grown very rapidly and have developed into great commercial or industrial cities, although their plans violate almost every principle laid down by city planning authorities. Their growth, however, has been due to certain natural advantages and to the general development and prosperity of the districts tributary to them, and they have grown in spite of the handicap of a poor plan. When its defects and the embarrassment to business due to them become apparent vast sums are often spent to cure the defects which might have been discovered and avoided had sufficient study been given to the plan when it was first under consideration, and the increased cost of doing business for a period of years and the large sums spent in the correction of the plan might have been saved. The cost of reconstruction has run far into the millions in nearly every large city except Washington, which was so planned as to provide for future growth. To give figures for different towns is unnecessary, but the total would be staggering. The beneficial results of such changes as have been made will be evident upon a comparison of the taxable values in their vicinity before and after the improvements have been carried out.

Estimates of the losses due to delays caused by traffic congestion, to unnecessarily long hauls, to the double or triple handling of goods where one such operation might have sufficed, are, as already stated, unreliable, although they have been frequently presented as arguments in favor of the improvement of existing conditions. If a million passengers are carried by surface railways or omnibuses each day—and this number is greatly exceeded in several large cities—and if the loss in time due to traffic congestion through inadequate street capacity averages ten minutes a day, the total daily loss of time would be equivalent to 20,833 working days of eight hours each. If the average pay of those who were subjected to this delay is assumed to be \$3, and if but one-half of this time is a loss to their employers, the total loss in productive work during a year of 300 working days would be \$9,375,000, to say nothing of the loss of efficiency by reason of worry and wear and tear in reaching their places of employment. This would represent five per cent on \$187,500,000. If in this same city there are 60,000 horse and motor trucks that are subject to an average delay of half an hour a day, and if they represent a cost of \$5 for a day of eight hours, their loss in time, all of which would fall upon the employer or owner, would represent a value of \$5,625,000 during a year of 300 working days, which is equivalent to five per cent on another sum of \$112,500,000. It may be argued that the expenditure of \$300,000,000 would be justified if these losses could be eliminated.

While such arguments are of little real value they are frequently used; but why try and prove by figures something which is so evident that it cannot be gainsaid? If improvements to correct such defects and do away with such delays were not worth while, why are they so frequently undertaken? Why, also, is it that the cities which have the courage to undertake them are those which are conspicuous for their rapid increase in population and wealth? What induced them to undertake such great and costly improvements? It was not merely for the sake of spending public funds and thus increase the burdens of taxation.

It was because they had found that it paid in the case of other improvements and believed that it would pay again. Did Paris make a good investment when it expended hundreds of millions of francs in beautifying the city and making it a more attractive and convenient place in which to live and do business? Ask the Parisians and see. Ask them also what prompts them to consider further great undertakings of this kind, unless it is due to the beneficial results of those carried out under Haussmann. Did it pay Vienna to create its great Ringstrasse and place along it the important state and city buildings, thus creating one of the show streets of the world? Ask the Viennese and see what they will say. Did it pay Dresden to build along the river front the beautiful Bruhle Terrace, which has been called "the Balcony of Europe"? Did Hamburg find it profitable to expend millions in deepening the Elbe and building its great docks and terminals? Has Frankfort regretted its enterprise in developing its river front for manufacturing and shipping terminals? Have the German cities found it worth while to place their important railway terminals where they will make a favorable impression upon those who enter and leave the cities through them, to provide generous open spaces in front of them and broad avenues leading from them? Does Cologne feel that it has acted wisely in creating great circumferential boulevards on the spaces formerly occupied by its fortifications? Put these questions to the people of these cities and also examine the table showing the growth of German cities from 1880 to 1910, given in another chapter, and there will be no uncertainty as to their answers or as to the reader's conclusions.

Have the various improvements carried out by the municipal authorities of London, the embankments along the Thames and the tunnels under the river, the creation of Queen Victoria Street, the Strand-to-Holborn improvement and the extension of port facilities been profitable investments? Has Edinburgh found that the Princes Street Gardens and the location of its two principal railway stations, so that the visitor arriving at them is impressed with the beauty of the surroundings, are an

asset to the city? Have Buenos Aires and Rio de Janeiro been repaid for expending large sums in the improvement and beautification of their water-fronts? Has Boston begun to realize on its investment in a comprehensive park system? Has New York found or does it expect that the enormous sums expended on its new water supply and its transit system will be a good or a bad bargain? Does Chicago propose to recast the plan of the central part of the city simply for the applause that will come to it for its courage, or because it expects that the improvements will bring a direct return to the city? Do Kansas City and Denver regret their expenditures for park and parkway systems, or do those who paid special assessments for them wish they could get their money back and give up the parks and parkways? Do the wonderful cities of the Pacific Coast, both in the United States and British Columbia, feel that they have gone too far in undertaking great and costly reconstruction and betterments? Ask all of them and see what they say.

But why continue to put questions, the answers to which are self-evident? Yes, a good city plan pays. The benefits cannot always be computed in money, but they are quite apparent, and every town which has tried to improve its plan seems satisfied that it has done a wise thing and would not go back to the old conditions; but the price paid has been a heavy one in many cases. How much better then if this enormous cost of rearrangement could have been avoided by a more careful study of the plan when it was first worked out. That would be constructive city planning, the advantages of which cannot be computed in money, but which can readily be realized when we consider the enormous expenses which have been incurred by cities where this preliminary study was not given and where the corrections had to be made at a subsequent time.

There is one other result of improvements which will facilitate business; they will almost always bring about better and more wholesome living conditions for the workers. They will let in the light and air. They will permit the toilers to spend more

of their time at home, or, with the same expenditure of time, they will be able to have their homes farther away from the noise and confusion of the town and rear their families amid better surroundings, it being assumed that a town which is capable of great undertakings to improve business conditions will be equally solicitous as to the living conditions of its people, and will see that the streets on which their homes are located will be well cared for, that open spaces will be provided for their recreation, and that good drainage, pure water, and sanitary housing will be insured to them. These should be theirs by right as well as facilities for conducting business are the rights of the merchant and the manufacturer.

CHAPTER X

THE INDUSTRIAL TOWN OR DISTRICT

THE industrial town differs from other towns and the industrial districts of any town differ from its other districts in certain respects. A greater proportion of their area must be given over to the mills, shops or factories where are fabricated the articles which the town or district produces, which have created its prosperity and wealth and which have made it known abroad. When one thinks of Pittsburgh it is in terms of iron and steel and the smoke and grime that always go with their production. Sheffield suggests cutlery; Manchester, cotton goods; Lyons, silk; Essen, ordnance and steel forgings; Grand Rapids, furniture; Minneapolis, flour; Omaha and Kansas City, packing houses and stock-yards. The larger cities have such varied industries that we think only of the great value of their manufactured products and do not identify them with any particular output, yet different parts of these cities are as closely identified with certain industries and activities as are the smaller towns with their one chief product.

While certain fundamental principles should control the planning of these towns or districts as well as those which lack the distinctive label of iron, cotton goods, furniture, flour, or whatever it may be, there are special needs which must be taken into account in working out their plans. Facilities for the expeditious and economical receipt, handling and shipment of raw materials and manufactured products must be provided in order that these costs may be reduced to a minimum and a greater proportion of the value of the output may go to the labor which creates it. It follows that ample facilities for movement by rail or water or both must be made possible. The workers should be able to reach their places of employment

It occasionally happens that an industrial plant is established in a location remote from any existing city and where a new town must be provided to furnish homes for its employees. An opportunity is thus presented to plan in a rational manner for the development of the entire town; the plant itself with adequate shipping and handling facilities; homes for the operatives and for the principal officers, superintendents and technical experts; shops, places of recreation and amusement, schools and buildings for the conduct of the administrative business of the new town and in fact for every phase of urban life. In the feverish haste to get things started, and to offset by earnings the interest on capital outlay, little thought is commonly bestowed upon anything but what is considered the productive plant, the town being left to grow for itself or to be exploited by real-estate speculators who see the probability or the certainty of a great increase in land values.¹ Instances of the extraordinary advance in land values following the establishment of an industrial center are given by Mr. Graham Romeyn Taylor in his book on "Satellite Cities," which graphically describes the physical and social conditions which have grown up about industrial plants.¹ One of them is that of the land purchased by the Corn Products Refining Company in the city of Chicago in 1879 for \$147,000. When the plant of this company was removed to a site further out of the city in 1908 an offer of \$2,500,000 for the property was refused. Another case is that of the Pullman Company, which stated in 1893 that the time was near at hand when the \$30,000,000 capital stock of the company would be covered by the value of the 3500 acres of land on which the town was built. This company, however, was not permitted to reap the complete advantage of this enormous increase in land values for the reason that the Supreme Court of Illinois decided that its charter did not authorize it to engage in the real estate business or to hold any real estate beyond that required for its manufacturing business,

¹ Some of the statistical information in the following pages has been taken from Mr. Taylor's book.

and it was obliged to abandon the rôle of real estate operator.

When the United States Steel Corporation created Gary, Indiana, it built a plant which is undoubtedly a thoroughly modern one, and so arranged as to reduce the cost of production to a minimum. The company was obliged to provide a town in which its officers and operatives might live, and there was much comment at the time as to the thoroughness with which this—that is, the construction work connected with the establishment of the new town—was being done. It may be that the corporation did not realize what a big thing it was doing and how important a city it was founding. At any rate, the opportunity to establish a comprehensive plan was not availed of. The company laid out and kept control of one limited section and refused to profit by increased values at the expense of its employees. The growth of Gary has been spectacular. In the spring of 1906 the site was simply a level stretch of land with a few scrub oaks and an occasional pond or swamp. Within three years a great steel plant and harbor had been constructed and a town of 12,000 inhabitants had grown up with 15 miles of paved streets, a sewer system, water, gas, an electric lighting plant, banks, hotels, newspapers, schools and churches. In 1912 this community had grown to more than 25,000 and in 1915 its population was estimated to be 40,000. The real estate speculators saw and were quite prompt to avail themselves of their chance, and a series of scattered and unrelated developments were undertaken. Fig. 48 (p. 190) shows very plainly what happened, and how an admirable opportunity was lost to plan and build a real city which might have been one of the most notable of its kind. It does not follow that the United States Steel Corporation did not make an effort to establish a town in which its employees could find decent and sanitary homes. It *did* make such an effort, and it was not simply intent upon the earliest possible dividends; it had at heart the best interests of the men in its service, but it did not go far enough in planning the original town. In the

It occasionally happens that an industrial plant is established in a location remote from any existing city and where a new town must be provided to furnish homes for its employees. An opportunity is thus presented to plan in a rational manner for the development of the entire town; the plant itself with adequate shipping and handling facilities; homes for the operatives and for the principal officers, superintendents and technical experts; shops, places of recreation and amusement, schools and buildings for the conduct of the administrative business of the new town and in fact for every phase of urban life. In the feverish haste to get things started, and to offset by earnings the interest on capital outlay, little thought is commonly bestowed upon anything but what is considered the productive plant, the town being left to grow for itself or to be exploited by real-estate speculators who see the probability or the certainty of a great increase in land values.¹ Instances of the extraordinary advance in land values following the establishment of an industrial center are given by Mr. Graham Romeyn Taylor in his book on "Satellite Cities," which graphically describes the physical and social conditions which have grown up about industrial plants.¹ One of them is that of the land purchased by the Corn Products Refining Company in the city of Chicago in 1879 for \$147,000. When the plant of this company was removed to a site further out of the city in 1908 an offer of \$2,500,000 for the property was refused. Another case is that of the Pullman Company, which stated in 1893 that the time was near at hand when the \$30,000,000 capital stock of the company would be covered by the value of the 3500 acres of land on which the town was built. This company, however, was not permitted to reap the complete advantage of this enormous increase in land values for the reason that the Supreme Court of Illinois decided that its charter did not authorize it to engage in the real estate business or to hold any real estate beyond that required for its manufacturing business,

¹ Some of the statistical information in the following pages has been taken from Mr. Taylor's book.

and it was obliged to abandon the rôle of real estate operator.

When the United States Steel Corporation created Gary, Indiana, it built a plant which is undoubtedly a thoroughly modern one, and so arranged as to reduce the cost of production to a minimum. The company was obliged to provide a town in which its officers and operatives might live, and there was much comment at the time as to the thoroughness with which this—that is, the construction work connected with the establishment of the new town—was being done. It may be that the corporation did not realize what a big thing it was doing and how important a city it was founding. At any rate, the opportunity to establish a comprehensive plan was not availed of. The company laid out and kept control of one limited section and refused to profit by increased values at the expense of its employees. The growth of Gary has been spectacular. In the spring of 1906 the site was simply a level stretch of land with a few scrub oaks and an occasional pond or swamp. Within three years a great steel plant and harbor had been constructed and a town of 12,000 inhabitants had grown up with 15 miles of paved streets, a sewer system, water, gas, an electric lighting plant, banks, hotels, newspapers, schools and churches. In 1912 this community had grown to more than 25,000 and in 1915 its population was estimated to be 40,000. The real estate speculators saw and were quite prompt to avail themselves of their chance, and a series of scattered and unrelated developments were undertaken. Fig. 48 (p. 190) shows very plainly what happened, and how an admirable opportunity was lost to plan and build a real city which might have been one of the most notable of its kind. It does not follow that the United States Steel Corporation did not make an effort to establish a town in which its employees could find decent and sanitary homes. It *did* make such an effort, and it was not simply intent upon the earliest possible dividends; it had at heart the best interests of the men in its service, but it did not go far enough in planning the original town. In the

quickly and comfortably and should be assured decent and wholesome dwellings, in order that they may render efficient service. Provision must be made for their homes in as close proximity to the plants as will permit such conditions to be realized, while the place set apart for these homes can usually be so chosen that the prevailing winds will carry the smoke, fumes and gases away from rather than towards them. A mill and factory population will create a considerable amount of general business which should be carried on even more economically than that of the fashionable shopping districts; it will have the same need of entertainment and recreation as will that of exclusively residential towns and districts. While these facilities may be on a less pretentious scale, the needs of such a population are proportionately great, and ample provision should be made for them.

While lack of planning has been a conspicuous characteristic of the average city, it has nowhere been so marked as in the case of the industrial town. The person, firm or corporation establishing a new plant is quite certain to give very careful consideration to the suitability of the site, the transportation facilities, room for expansion and the probability of an adequate supply of labor, but little thought appears to have been given to the place where or the manner in which the operatives are to live. Many towns offer inducements of various kinds to manufacturers to establish plants in them, these sometimes being in the form of free sites or exemption from taxation for a term of years, and such towns realize that every new plant will bring additional population and increased business. How the newcomers are to live is usually a matter of indifference. It is expected that they will make more business for existing shops, and the suggestion that they should be well housed in a separate quarter convenient to their work and that they should have there the shops to supply their household needs and places of amusement suited to their resources will doubtless be strongly resented by those who may already have built up business of this kind.

design of the plant the greatest foresight and ingenuity were exercised in order to render the handling of material as economical and expeditious as possible. Every shop and other building was so located that spur tracks could be run into or alongside of it, with such curves as would reduce to the lowest limit the tractive force required to move cars. Wherever there was an opportunity for a short-cut it was availed of. In

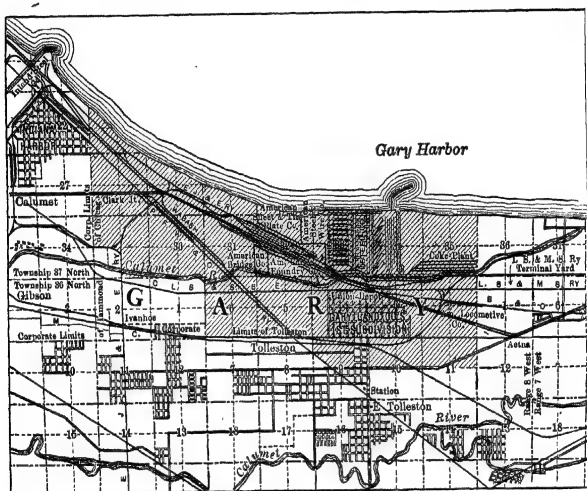
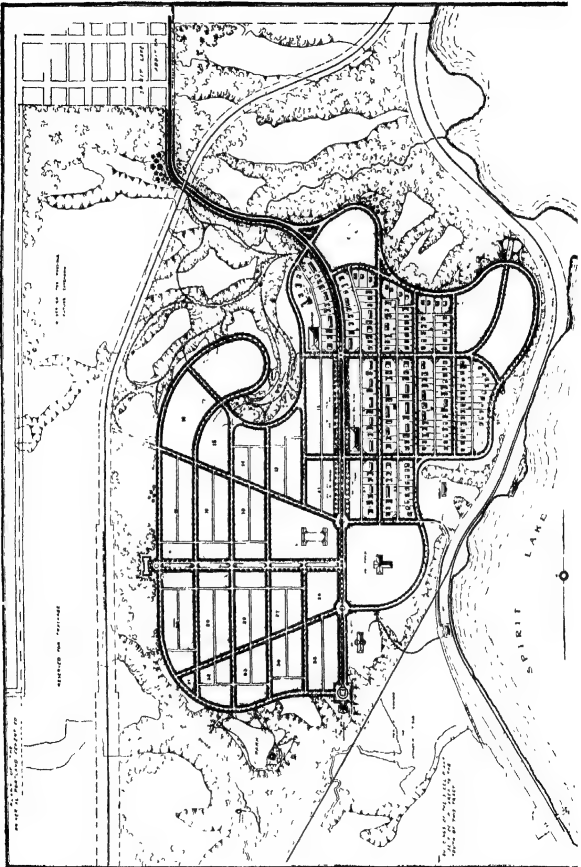


FIG. 48.—Plan of Gary, Ind., the industrial town established by the U. S. Steel Corporation.

the plan for the town, however, no such foresight appears to have been displayed. The workers in going from their homes to their labor and back have no direct routes which they can follow, and the facility of movement, so well provided in laying out the plant, was entirely overlooked so far as the conduct of the miscellaneous business of the town was concerned. The land company, a subsidiary of the United States Steel Corporation, which laid out the first subdivision, attempted to plan the town, but with indifferent success. While in designing the



A reinforced concrete bridge by which the road around the Ashokan Reservoir, 100 miles from New York, is carried across a ravine (p. 174).



Plan of an industrial town established by the Minnesota Steel Co. near Duluth, Minn. This and the upper view on Pl. 52 are reproduced from a plan and photograph kindly furnished by Mr. Owen Brainard, Consulting Engineer (p. 191). See Pl. 52, p. 196.

plant the best expert advice was secured, it did not occur to them to retain the services of a city planning expert to work out the plan for the town, and already Gary, like older towns, has begun to appreciate the need of securing such advice in order that it already may begin the correction of its mistakes. And yet the original town possesses some excellent features. Building lines from 20 to 35 ft. back of the street lines have been established for all but the chief business streets, several parks have been created and some of the public and semi-public buildings have been effectively grouped. It is to be regretted that occupation of the entire lake front by the steel plant has made it impossible to provide any water-front park for the use of the people. But Gary has done some notable things. Her school system, under the direction of Dr. William A. Wirt, has become known throughout the educational world as the "Gary Plan," and is being adopted elsewhere as one which will permit the most effective use of the school plant as a social as well as an educational agency.

That this corporation realizes what might have been but was not done at Gary appears evident from the course followed by one of its subsidiary companies in the establishment of another industrial town on the outskirts of Duluth. Here a town plan has been evolved to accommodate the workers in the steel mills and cement plant which have been built, the general features of which are shown by the illustrations (Pls. 51 and 52).

The considerations which should control the establishment of a residential district in connection with a manufacturing plant have been outlined by Mr. Owen Brainard, of the firm of Carrère & Hastings, who were advisers on the plan for the Duluth development, somewhat as follows:

Given the probable number of employees of a plant, provision should be made for a town to accommodate three or four times that number, that being the probable ratio of total population to total number of workers in the plant. The development should be progressive and should begin with provision for hous-

ing the workmen engaged in the construction of the plant. The boundary of the development should be marked by some distinguishing feature—rows of trees or open spaces. In the working out of a street plan account should be taken of existing public roads. The principal streets should be of liberal width and lead to the entrances to the plant. Secondary streets should be 50 ft. wide, with roadways of 24 ft. or less in some cases. All street roadways should be paved, using such local material as is available if it is adapted to the purpose. The trees on the tract should be saved wherever possible and a general scheme of tree planting should be worked out and begun at an early stage. In designating the streets, names should be selected which would be related to the local history and the history of the development of the industry to be provided for. Dwellings should be so designed that they can be built and maintained at a cost which will permit rentals lower than could be offered by other land developers in the vicinity, particular attention being devoted to the supply of houses for the lowest paid labor. Sites should be provided for schools and public buildings, suitably grouped where the use for which they are designed renders such grouping practicable. A building code and a sanitary code should be carefully worked out for the new town, and it should be so reasonable and at the same time so effective that, if the development is absorbed by some municipality, these codes will be likely to be respected and continued.

In marked contrast with most of the communities that have grown up about manufacturing plants is the new industrial town of Fairfield near Birmingham, Alabama. In this case as much care and forethought appears to have been bestowed upon the planning of the town as upon the advantageous location of the steel plant. The corporation did not attempt to finance the building of the town, nor did it permit it to be exploited by land companies which had no special interest in its future. A land company was organized among a group of men whose first interest appears to have been to plan a suitable town and whose first move was to secure the services of an

expert in town planning. The plan was worked out with much care and was made to fit the topography; the main streets were given an adequate width; sites were selected for public buildings which would form an effective group about a generous plaza; suitable restrictions as to heights, building lines and use were imposed under a zoning system. The building lots are of good size, with provision for kitchen gardens in the rear, and a scheme of tree and shrub planting was worked out in advance. It is said that the object lessons afforded by Fairfield have already had a marked effect in the improvement of conditions in Birmingham and the smaller towns in its vicinity.

Writers and speakers on city planning and housing frequently draw rather startling contrasts between the worst conditions which can be found in industrial towns of their own country and the best which has been done in other countries. They like to show pictures of the most distressing living conditions in Pittsburgh and Fall River side by side with those of the workmen's cottages at Essen, and give the impression that the manufacturing towns in the United States are examples of hopelessly bad planning and utter indifference on the part of employers to the manner in which their workmen live, while similar towns in other countries are models of what ought to be. The facts are frequently bad enough. The housing is often desperately bad, and statements that employees frequently elect to live in the most crowded and unwholesome quarters which are available, if by so doing they can save a small sum in rent, even though their pay would enable them to secure better accommodations, are probably based upon actual facts. Corporations and individuals who have tried to promote good living conditions and an attractive environment for their employees and have endeavored by well-intended and apparently reasonable regulations to insure the maintenance of these standards have encountered a spirit of resentment at what was thought to be too much paternalism or an interference with the freedom of their workmen. A notable instance of this feeling is afforded by Pullman. The failure of this

experiment was undoubtedly due to the fact that the model town which was created was founded upon paternalism. The company was autocratic in its control of the living conditions of its employees and, while it exercised a benevolent despotism, it could not win the confidence and co-operation of the men, and the dream of its founder was effectually shattered by the great strike which occurred within the decade following the establishment of the town.

Between this control by the employer, whose interest in the employee is sincere, though not wholly unselfish, and exploitation by the real-estate developer, whose interest ceases when his last lot has been sold, there seems but one other course; that is, co-operative ownership and control on the part of the employees themselves. This has been most successful in Great Britain and Germany, where they have been able to secure the use of large funds at very low rates of interest, the State itself often supplying the money. This has not yet been done in the United States, but it may be possible for such co-operative enterprises to be carried out through the aid of Building and Loan associations which have been very successful in this country and which would be unlikely to arouse suspicion or distrust on the part of the workmen.

While new industrial towns have been started and have grown in a spectacular fashion, there is a movement constantly under way which is even more significant from a city planning point of view. Many manufacturing concerns which were originally located in large and growing cities, influenced no doubt by the prospect of an adequate supply of labor, have found it impossible to expand with increasing business. They have found themselves hemmed in by a rigid and inflexible street system which would, if they overlapped the original city block or blocks on which they first located, divide the plant into several separate units when there should be but one, render it impossible to extend their railway tracks, and the cost of operation is increased. The situation becoming intolerable, they have concluded to scrap the buildings and such of the equipment as

could not be removed and go farther out where there is no such thing as a street system to hem them in; but they have removed only the plant and have made no provision for their employees, who were obliged to follow as best they could, retaining their old homes in the city and travelling the five, ten or more miles into the country for their work. Rarely has any attempt been made to provide homes for the workmen which would permit them to live comfortably in close proximity to their places of employment. Cities have thus lost one industry after another as the result of defective and unadjustable plans. The companies have left to chance, or to others who see an opportunity for profit, the provision of homes for their workmen, and other shabby and insanitary industrial districts are in process of development.

The tendency of manufacturing establishments to locate on the outskirts of cities is shown by the report of the Census Bureau. In thirteen industrial districts, each of which covers a large city and its vicinity, the increase during the ten years from 1899 to 1909 in the number of workers in the cities themselves was 40.8 per cent, while the increase in the number of workers in the surrounding zones was 97.7 per cent. There are cases where factory employees are unable to find homes in the vicinity of their work, owing to the high class of the development. Such unusual conditions exist in the neighborhood of Cincinnati. A number of large manufacturing plants have been located in suburbs outside the city limits. These suburbs have attractive sites and the working conditions are exceedingly favorable, but during the decade or more since they were established little has been done to provide homes for their operatives. Some houses and flats designed to be within the means of factory workers were erected, but the real estate men and builders found that there was more profit in building houses of a better class to accommodate Cincinnati business men who wish to live in the suburbs. Meanwhile nearly half of the employees of these plants have their homes in the tenement districts of Cincinnati and travel to their work in the suburbs every morning

and back every night, while about five per cent are said to live across the Ohio River in Kentucky. We have here the anomalous condition of an industrial suburb which has become an attractive residential district for those in no way connected with the industries about which these suburbs have been built.

How is the industrial town or district to be saved from the kind of development which, with a few conspicuous exceptions, has characterized most of them? It seems quite clear that the trouble has been due to the exploitation of the land by speculators who have been intent on getting out as quickly as possible with a handsome profit. In cases where the industrial corporation has itself attempted to control the development of the town as well as the plant it has either become an exploiter of the land itself or, if it has made an earnest effort to create an attractive town and wholesome surroundings for its employees, the latter have distrusted its motives or have resented the paternalistic spirit in which its plans were carried out. Proprietary towns, dependent for their existence upon a single industry, are likely to be seriously affected by the development of ill-will on the part of the citizen-workmen toward the individual or corporation which not only established the town but tries to administer its affairs. Permanent success is more likely if the planning of the town, the regulation of the use of property, and the entire conduct of the public business are left to some duly constituted authority, if there be one, whose jurisdiction covers or can be extended to include the territory within which the development is located, or, even if, as in the case of Fairfield, the entire business is turned over to some agency in which the individual or corporate proprietor is known to have no financial and perhaps not even a philanthropic interest. Many such enterprises have been established within the limits of municipal corporations which have manifested little interest in the orderly development of the part of the town in which they may have been located and have shown little capacity to solve the problems of planning and administration, if they made the attempt. There have been so many examples of the

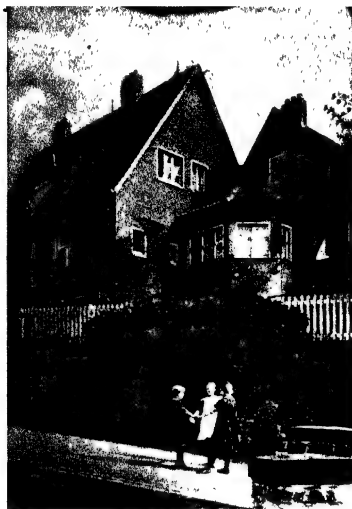


View showing the type of workmen's houses erected in the industrial town near Duluth, the general plan of which is shown on Pl. 51 (p. 191).



Cottages in Colony Gewerkschaft, Emscher-Lippe. This and the views on Pls. 53 and 54 and the plans on Pl. 55 are reproduced from a descriptive book published by the Krupp Co. in 1911 (pp. 197 and 301).

PLATE 53



Cottages in Colony Altenhof, Essen, where superannuated employees of the Krupp Co. are provided with houses free of rent (pp. 197 and 301).

heavy penalties which such towns have had to pay for their indifference or incompetence and a few such conspicuous instances of the great value of foresight in planning and administration that there has been an awakening as to their responsibilities and opportunities.

In cases where a new town is established outside the limits of or remote from an existing municipal corporation the problem is more difficult. Even if an intelligent plan may have been established, the administration of the town's public business and the regulation of its further development cannot be safely entrusted to its citizens, among whom there will be no men trained in municipal affairs. Leaders will come to the front, but they will scarcely be capable of dealing wisely with the intricate problems which will present themselves for solution. If a capable, strong and experienced municipal business manager is ever needed it is in a case like this, but there is no body of citizens less likely to appreciate the advantages of such a method of conducting public business or less willing to submit themselves to such a system than the population of a newly established industrial community.

There are some conspicuously successful industrial towns in Europe, and their success has been attained in different ways. Three typical towns developed under three distinctly different systems will be briefly referred to. Perhaps there is no better instance of unresented paternalism than is to be found in Essen. The various colonies established by the Krupp Company are admirable instances of town planning, as will be seen by reference to Pls. 52, 53, 54 and 55 (pp. 204 and 205), but these colonies cover a relatively small part of the city, which in the spring of 1914 had a population of about 325,000, and which had increased over 170 per cent in the preceding fourteen years. Even Essen itself is a Krupp city, the entire public business of which, under the system of voting prevalent in some German cities, is almost completely controlled by this great corporation. That control is intelligent, and Essen is an unusually attractive city. Its affairs are administered by the City Council,

but in 1900, according to Mr. Frederic C. Howe, one-third of the members of that council were elected by three persons who were doubtless the principal owners of the Krupp works, another one-third was selected by 401 persons, a considerable majority of whom probably have an interest in the company, while the remaining one-third were chosen by the other 19,000 and odd electors. The plan of the town, the street details, the location of public buildings, and even the development of private property are rigidly controlled by Dr. R. Schmidt, the accomplished chief engineering official of the city.

In Letchworth, England, we find an example of a town which, while planned and generally known as a garden city, is far more than that. It not only provides homes but employment, having set apart sites for industrial establishments and having brought such establishments to the sites. Further than that, an effort has been made to secure a diversity of industries, so that the working population is not as likely to suffer from inactivity in or the entire suspension of a certain kind of production as would be the case were they all engaged in the manufacture of steel, woollen goods, furniture, or some other single output. Here we have an admirable example of collective planning and control. The original capital was supplied by a group of individuals who were interested in the success of the plan and who were content to invest their money at a low rate of interest and were willing that the people who came to the town for their homes and their livelihood should enjoy the benefit of the increase in land values which resulted from their presence and their labor.

In Birmingham, England, we find one of the best instances of the exercise of wise control by the municipal corporation itself of its industrial development. Birmingham's corporate limits have been so extended as to take in outlying industrial towns, some of which had already been started in an admirable manner; but the city did not confine itself to extending its territory; it has set about the improvement of the older parts of the city, the better placing of its public buildings, the improve-

ment of its transit system, adequate water supply and drainage, and the betterment of housing conditions. No one man or group of men or no great corporation has brought this about, but the city itself has done it. Able leadership there has been, of course; Mr. Joseph Chamberlain, in the establishment of wise municipal policies, and Mr. J. S. Nettlefold, in an aggressive movement for improved housing, have rendered splendid service; but the citizens have found that these things are worth while and are now taking advantage of the opportunities which are afforded by the British Town Planning Act to further improve existing conditions and insure orderly growth.

Many other towns might be referred to, some of which have been planned as garden cities, but have already become or are becoming industrial towns, and it is difficult to classify them. Garden cities have usually been started as home communities rather than as industrial centers, and they are so considered in another chapter. The economical planning of manufacturing plants can safely be left to the industrial corporations, but they have been slow to realize that the plant which they may establish will need for its real success a well-housed and decently living community upon which to draw for their labor, while the town in which the plant is located must wake up to the fact that, while the plant itself may be a valuable contributor to its prosperity, an orderly community of workers in an orderly and attractive part of the city is a still more valuable addition to its citizenship, while disease, disorder and unrest, which are fostered by disorderly streets, bad sanitation and over-intensive building, are a menace to the community, will give the town a bad name and add greatly to the municipal tax budget.

CHAPTER XI

STREET TRAFFIC

AS noted in a previous chapter, the purpose of the city street is twofold: to provide light and air and afford access to the abutting property; to provide accommodation for such traffic as may pass through the street, but the origin and destination of which may be elsewhere, the route followed being that of least resistance in the case of business traffic, or that which is most agreeable in the case of pleasure traffic. The relative amount of local and through traffic will vary greatly in different streets, and even in the same street, from day to day, according to weather and other conditions. This mixed traffic is a fruitful source of controversy, especially where the cost of the first pavement or renewals, or any part thereof, is assessed against the abutting property, the owners of which protest against paying for road improvements for the accommodation of what they call "alien traffic."

The problem of making provision for transportation by natural routes or by routes exclusively devoted to the purpose, whether on property especially acquired for its accommodation or above or beneath public streets, has been treated in the chapter on Transportation, and under street traffic consideration will be confined to free wheel and pedestrian traffic and that by surface railways, which affect the more ordinary uses of the streets. In the small town the problem is a simple one, and the increase of traffic which occurs on certain days adds a degree of life and interest which is an agreeable change from the monotony of existence in a provincial town. As the town becomes a city, and as the city continues to grow, the increase of traffic results in congestion with its attendant delays and

dangers. The time comes when the free and irresponsible movement of vehicles must give way to a certain degree of control, and intelligent police control has accomplished much in avoiding both danger and delay. Rules for traffic regulation are frequently resented when first imposed, but they are soon found to be for the best interests of both the public and the individual and are then accepted and respected. The sight, once so common at busy street intersections in great cities, of a mass of vehicles headed in every direction, with interlocked wheels, and with cursing drivers venting their bad tempers on distracted horses under the eyes of helpless police, with entire cessation of movement for many minutes, is now so rarely seen as to excite wonder and disgust. The improvement in conditions resulting from police regulation is so obvious that one is now surprised that it was not earlier resorted to. While such regulation has accomplished much, the constantly increasing volume of traffic on many thoroughfares will soon require other relief which seems possible only through the provision of additional or the widening of existing roads. The problem to-day, as stated in the report for 1913 of the London Traffic Branch of the Board of Trade, is "to pass by artificial regulation through existing streets of inadequate capacity with safety to both passengers and pedestrians a larger volume of traffic than the streets would accommodate were the movement of vehicles and pedestrians left uncontrolled."

The electrically operated surface railway, which has become so efficient a means of transportation in the streets, while carrying a greater number of passengers than any other vehicle, has pre-empted to its own use a considerable portion of the roadways, and interferes very seriously with free-wheel vehicle traffic, which the streets would otherwise be called upon to accommodate.

In no city have the problems of street traffic attracted so much attention, and it is probable that in no city are they so serious as in London, and some space can properly be devoted to their consideration. The surface railway system of London is

confined almost entirely to outlying districts, and the surface lines, although owned and operated by the London County Council, do not enter the square mile of territory known as "the city," and are excluded from Westminster, except for a short distance under the Kingsway and along the Thames Embankment and from other large areas where the traffic is dense. Advocates of the trolley street railway may contend that if these lines were allowed to traverse all parts of the city, London's traffic problem would be less serious. The streets, however, are for the most part narrow and could not accommodate double-track lines, while even single-track railways would be practically impossible. The omnibuses are popular and cheap for short distances, and the passenger transportation service of London has developed chiefly as a free-wheel system (Pl. 56, p. 210). Since motor buses have displaced those drawn by horses, the efficiency of this system has been enormously increased. In London, as in other cities, the number of passengers carried appears to increase much more rapidly than the population and to depend rather upon the facilities offered than upon the number of people to use such facilities. The London Traffic Branch of the Board of Trade gives the increase in the number of passengers carried in 1913 over the number carried in 1903 as 50.1 per cent by the underground railways, 102.2 per cent by the surface railways, 91.9 per cent by omnibuses, and the total number of journeys per head, excluding those by trunk-line railways, as having increased 68.3 per cent, while during the same period the population of Greater London increased but nine per cent. In studying these figures it should be remembered that the development of the surface railway system is quite recent, that the underground railways were in successful operation by 1903, and that the use of omnibuses, which were first introduced about the middle of the last century, long ago became a well-established habit in London; and yet of the total number of passengers carried by the above means of conveyance in 1913, the underground railways accommodated 24.4 per cent, the surface railways 44.7 per cent, and the omnibuses 30.9 per cent. It is therefore

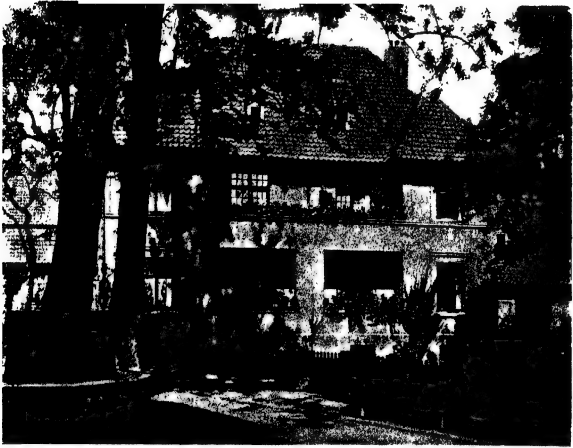
apparent that the London tramways, even though excluded from the portions of the city where the traffic is most dense, carry more passengers than either the underground or the omnibuses, although an average yearly increase of more than fifty-three millions in the total number of passengers carried by the tramways for eight years preceding 1911 was changed to a decrease of 24,332,160 in 1912.

An important phase of the traffic problem is the competition of the privately owned omnibus lines with the publicly owned surface railway or tramway lines and even with the trunk-line railroads carrying suburban traffic. It appears that in 1902 five of the trunk lines having their termini in London carried 352,555,560 passengers, exclusive of holders of season tickets, and that this number steadily decreased until 1909, when it was 298,193,805. There was a recovery to about 311,000,000 in 1910 and to 319,000,000 in 1911, with a drop to 309,490,247 in 1912. While the decrease in the number of passengers carried from 1902 to 1909 was 15.4 per cent, the decrease in gross passenger receipts, excluding season tickets, was but 3.3 per cent, indicating that the loss in cheap suburban traffic may have been more than made good by long-distance travel, although there may have been a loss in net receipts. This competition by the omnibus lines is not confined to the fully developed districts, but appears constantly to extend further from the central part of the city.

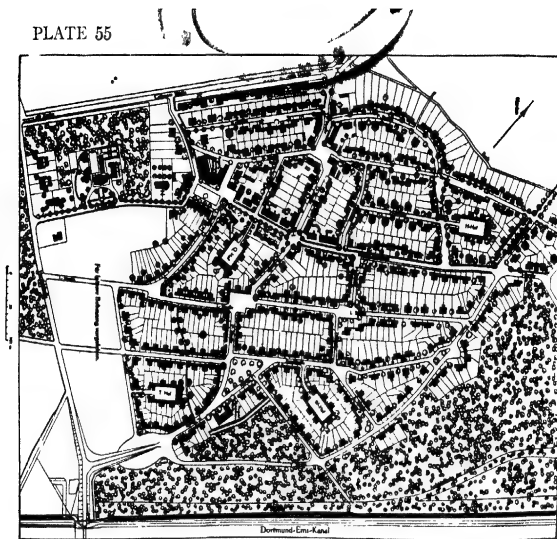
The tramway lines are more seriously affected. These, as already stated, are owned and operated by the London County Council, and every effort has been made to attract business. Large signs on the cars and elsewhere announce that "The quickest way is the tramway," or "The best way is the tramway." Yet not only the London lines but the tramways operated by other Urban District Councils within the Metropolitan area are run at a loss, and they are confronted with a very serious financial problem. They suffer from the competition of the omnibus lines, which have advantages over them that seem very unfair. Tramway lines, although publicly

owned and operated, are obliged to contribute to the upkeep and improvement of the streets traversed by them, besides being substantially taxed for their roadbeds. Of 37 street improvements in progress but not completed in 1910, 22 were on streets in which there were surface railway tracks, and the London County Council, as the owner of these tracks, contributed from one-fourth to two-thirds of the cost of the improvements, or about \$1,546,500 out of a total of \$4,309,800, or nearly 36 per cent. The omnibus companies, on the other hand, appear to contribute nothing toward the expense of constructing or repaving the streets through which they run and to be unrestricted as to their routes or as to the fares charged. The vehicles, drivers and conductors are licensed by the Metropolitan Police and are subject to certain regulations, while the omnibuses are registered as heavy motor cars and their drivers are obliged to obtain licenses from the London County Council; but the revenues derived from these sources are very small. The tax on gasoline is high in Great Britain, but the receipts go to the General Government and are in large part turned over to the Road Board for its use over the United Kingdom.

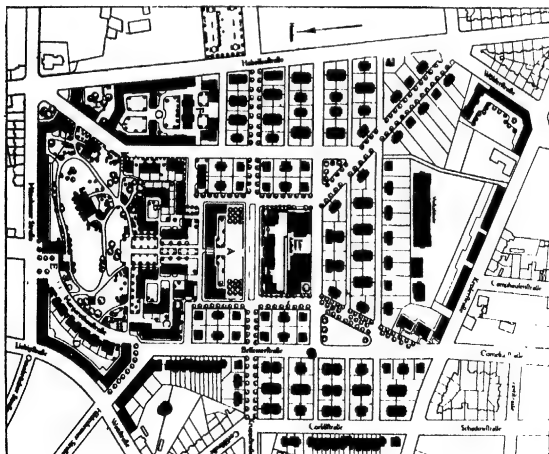
The omnibus system has a great advantage in its flexibility. It can concentrate its vehicles on certain routes where there may be a temporary increase in traffic; it can lengthen some of its lines into the suburbs on Sundays and holidays and curtail the service in the business districts, restoring the normal service the next morning; it can transfer a fleet of omnibuses to some district entirely without the city to accommodate an influx of people attracted by races, regattas or athletic contests; it can respond instantly to a rapid development in some section of the city or suburbs, while to supply a tramway line would involve great delay, first in securing franchises from the local authorities, and then in construction, which is necessarily slow in the public streets; it can, if a change of route appears desirable, both from the viewpoint of the public service or of more profitable operation, make such a change overnight; and finally, it is altogether free from the annoying interruptions to traffic



Typical houses for workmen in Colony Alfredshof, Essen The upper view shows a dwelling to accommodate five families (pp. 197 and 301).



Plan of Colony Gewerkschaft, Emscher Lippe (pp. 197 and 301).



Plan of Colony Alfredshof, Essen (pp. 197 and 301).

caused by the disabling of vehicles, the obstruction of tracks, and the delays incident to periodical track repairs and reconstruction.

The heavy vehicles are very severe in their effect upon the roads. A new route may traverse a road with an inadequate foundation and a surface incapable of sustaining motor traffic of this type; but the omnibus company is under no obligation to adapt the road to the use to which it may desire to put it. That is left to the public authorities to be done at public expense. An instance of this kind was given the author by one of the engineers of the London County Council: An omnibus line had lately been established running through streets in one of the outlying portions of the county of London, where the road crust was insufficient to sustain such heavy vehicles as motor omnibuses, and the London County Council was compelled to raise by loan some \$80,000 for reinforcing the road surface. Soon after this work was done the omnibus company decided that a modification of the route would be desirable, and a change was made, with the result that for a considerable portion of the distance another road was followed, where again the surface was insufficiently strong to sustain this class of traffic, and a further improvement was made necessary at large expense.

Further than this, the omnibus companies are unrestricted as to fares. Where competition exists they meet it; where they have the field to themselves, the fares are kept up. In the summer of 1913 the omnibus fare from Victoria Station to Sidcup, a distance of about 12 miles, was 18 cents, much more than the rate for a corresponding distance by tramway line, or by omnibus where other lines are in competition, while it seems absurdly high as compared with a ride of $17\frac{1}{2}$ miles for five cents in New York, where, however, the shortest ride costs the same five cents.

While London has always used omnibuses, a striking feature of this kind of traffic is the rapidity with which motor vehicles have supplanted those drawn by horses, the change resulting in greatly increased speed, fewer vehicles for the same service,

and greater popularity, as is indicated by the fact that of the 91.9 per cent increase in the number of passengers carried by omnibuses from 1902 to 1912, 60.7 per cent of this increase took place from 1910 to 1912, the period during which the change in motive power chiefly took place, while the increase for 1912 over 1911 was 151,000,000 passengers, or 37 per cent. During this time there has been an actual decrease in the total number of omnibuses operated. In 1903 there were 3636 omnibuses licensed, of which only 13 were mechanically propelled, while in 1912 the total number licensed had decreased to 3284, of which 2908 were motor driven, and in the spring of 1914 the last of the horse-drawn buses was withdrawn and the number of those which were mechanically driven had reached more than 3000. In view of the above facts it is not strange that, while the publicly owned and operated tramway lines have been run at a loss, the £100 shares of the London General Omnibus Company, which were worth £18 in December, 1909, had risen in value to £400 in June, 1912.

The increase in the number of motor buses passing certain points has been very striking. The traffic census showed that in Oxford street there were 1000 more in 12 hours in 1913 than in 1912, while in the single hour between 6 and 7 P.M., 576 of these vehicles passed, as compared with 462 in 1912, or an average of one every $12\frac{1}{2}$ seconds in each direction, as compared with one every $15\frac{1}{2}$ seconds in 1912. Again, in Piccadilly, where the increase in the total number passing in 12 hours was found to be about the same as in Oxford street, 402 buses passed between 6 and 7 P.M., against 281 in 1912, the interval between buses in each direction having been reduced from $25\frac{1}{2}$ seconds to 18 seconds.

While the increase in passenger transportation by public-service corporations in city streets has been especially conspicuous and involves peculiar difficulties in London, owing to the narrow and tortuous streets of that city, it is equally noticeable in other cities, though it has not resulted in such congestion for the reason that these other cities have wider streets

or have made provision for main traffic arteries of generous dimensions, while nowhere else, perhaps, has the increase in passenger traffic by public-service corporations been unaccompanied by a decrease in the number of cabs, both public and private. Statistics collected by the Public Service Commission of New York city show that the number of passengers carried by the various transit lines in London, in 1911, excluding those handled by trunk-line railways, was in round numbers 1659 millions. In 1912 similar lines in New York handled 1150 millions; in Vienna, 886 millions; in Berlin, 760 millions; in Paris, 715 millions; in Chicago, 659 millions; in Philadelphia, 467 millions; in St. Louis, 376 millions; in Cleveland, 308 millions. The number of persons discharged into city streets at important railway terminals and traversing these same streets to reach the terminals is enormous. It is estimated that 100,000 persons pass through the Liverpool street station of the Great Eastern Railway in London in each direction daily, and this is exclusive of the numbers using the station of the Metropolitan Railway adjoining and that of the Central London Railway, which is located beneath the Liverpool street station. During the half hour between 8.30 and 9 in the morning 27 trains discharge about 18,000 passengers in this station, and during the half hour from 6 to 6.30 during the evening rush 24 trains take out 16,000 passengers, while during the four hours between six and ten in the morning, 71,000 persons arrive at the station, and a somewhat greater number leave it between five and nine in the evening. That there is serious congestion in the narrow streets leading to this station will be readily appreciated by reference to a map of London and noting the narrow and crooked streets leading to and from this terminal, which have been referred to elsewhere.

A type of public service vehicle which has lately been developed, but which has a limited and local use, is what might be called a trolley vehicle, taking its electric power from an overhead wire, but without tracks, so that it is a free-wheel vehicle within the limitations imposed by its connection with the

overhead conductor. Among the places where this type of car or omnibus has been used is the line connecting several of the towns on the north shore of Lake Geneva, in Switzerland. Connection between the overhead wire and the motor on the vehicle is made by means of a flexible insulated conductor, which shifts from one side of the vehicle to the other as it changes its position on the road; and as passengers are carried on the roofs of vehicles, the contact of this flexible conductor with their heads and shoulders is somewhat disconcerting. This system of transportation requires the installation of a central power station, as does an electric tramway, but avoids the provision of a permanent way and the limitations of fixed lines of movement, so that it has some of the advantages of free-wheel vehicles such as the motor omnibus.

The change from horse-drawn to motor-driven vehicles of all description during the past few years has been conspicuous. This can best be illustrated by the table showing the number of licenses issued by the London Metropolitan Police for cabs, omnibuses and tramway cars in the ten years from 1903 to 1912.

TABLE VII

SHOWING THE NUMBER OF LICENSES ISSUED BY THE LONDON METROPOLITAN POLICE FOR CABS, OMNIBUSES AND TRAMWAY CARS, 1903 TO 1912 INCLUSIVE.

YEAR.	CABS		OMNIBUSES		TRAMWAY CARS		TOTAL
	HORSE	MOTOR.	HORSE	MOTOR	HORSE	ELECTRIC	
1903	11,404	1	3,623	13	1,143	576	16,760
1904	11,057	2	3,551	31	928	810	16,379
1905	10,931	19	3,484	41	786	1,124	16,585
1906	10,492	96	2,964	783	905	1,396	16,636
1907	9,818	723	2,557	1,205	404	1,768	16,475
1908	8,475	2,805	2,155	1,133	323	2,003	16,894
1909	6,562	3,956	1,771	1,180	239	2,198	15,906
1910...	4,724	6,397	1,103	1,200	120	2,411	15,955
1911..	3,347	7,626	786	1,962	90	2,665	16,476
1912..	2,385	7,969	376	2,908	60	2,859	16,557

It will be seen that while horse-drawn cabs decreased during these ten years from 11,404 to 2385, motor cabs in-

creased from a single pioneer vehicle in 1903 to 7969 in 1912. The number of motor omnibuses licensed in 1907 was 1205, and during the following three years there was a decrease in this number owing, doubtless, to some mechanical difficulty which had not been satisfactorily solved, but from then on the increase in their number was very marked. During this ten-year period it will be seen that the total number of vehicles licensed has fluctuated somewhat, but in 1912 there were actually 203 less vehicles licensed than in 1903, and this fact alone will indicate the greater capacity of the motor vehicles, owing to their higher speed.

With the greatly increased speed of the motor vehicle it might be supposed that fewer vehicles would perform the service formerly rendered by those which moved more slowly, but this does not seem to be the case, the number in sight at one point at the same time being apparently as great as formerly. The number of vehicles passing certain points in all great cities is enormous. At Hyde Park corner, in London, a traffic census showed 41,000 passing in twelve hours, of which 65 per cent were motor driven.

A mere statement of the number of vehicles passing, however, does not give an adequate idea of the resulting congestion. Some offer far more obstruction to traffic than others, depending upon their size, speed and flexibility, while the roadway capacity may be such as to cause or prevent congestion. Enumeration is obviously the first step in a traffic census which will determine the amount of congestion, but the other factors just named must be given proper consideration before the degree of congestion can be determined. For purposes of comparison some common standard should be used, and this should be the same in different parts of the city, in different cities and in different countries. An attempt has been made at such standardization in London, and while it may not be the best and most rational that could be devised, its adoption marks a distinct advance over the individual and unrelated methods which have generally prevailed. In

working out this standard it was realized that, while the width of roadway is constant and can be accurately measured, and while the size of vehicles can be quite closely determined by the observer, estimates of speed may vary and the actual speed will depend upon the amount of congestion; but an experienced observer will be able to estimate it closely. The remaining factor, flexibility, is largely a matter of judgment, and the same observer may, in the hasty conclusion required in taking a traffic census, attribute different degrees of flexibility to the same vehicle at different times and under different circumstances. As a result of calculation, verified by extended observation, the degree of obstruction assigned to different vehicles in London is shown by the following table:

TABLE VIII

SHOWING THE RELATIVE OBSTRUCTION CAUSED BY DIFFERENT VEHICLES,
AS ESTIMATED IN LONDON

TRADE VEHICLES.		PASSENGER VEHICLES.	
1 Horse (fast)....	3	Electric Trams.. . . .	10
1 Horse (slow).... .	7	Omnibuses (horse).. . . .	5
2 Horse (fast).... .	4	Omnibuses (motor).. . . .	3
2 Horse (slow).... .	10	Cabs (horse).... .	2
Motor (fast)	2	Cabs (motor).. . . .	1
Motor (slow)	5	Carriages (horse)	2
Barrows...	6	Carriages (motor).. . . .	1
Cycles.....	$\frac{1}{2}$		

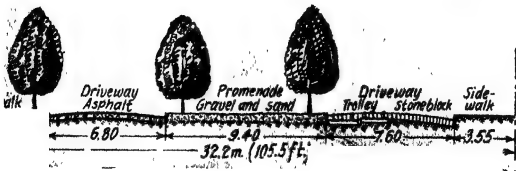
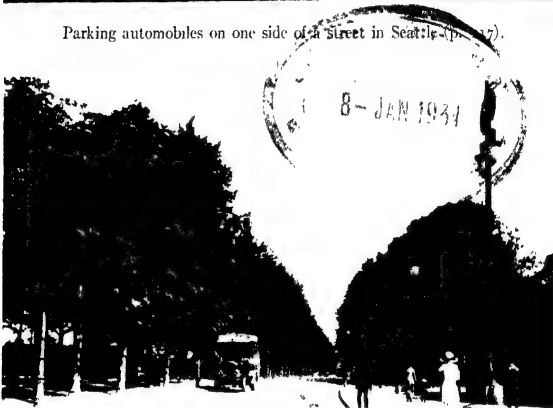
After the enumeration of each of the above classes of vehicles, the factors are applied to them, and the total of units divided by the number of minutes in the period covered by the observations will give what is called the average traffic volume. Average traffic density is the average volume in units for each ten feet of unobstructed roadway width. The average vehicle is the total number of vehicle units divided by the total number of vehicles passing the point of observation. The period of observation is usually the twelve hours from 8 A.M. to 8 P.M. Under such a system of estimating traffic an increase in the number of vehicles may be more than compensated for by a change in motive power, with increasing speed and flexibility.



The upper plan shows the tramway lines and the lower the omnibus routes of Central London. Both are reproduced from maps accompanying the report of the London Traffic Branch of the Board of Trade for 1912 (p. 202).



Parking automobiles on one side of a street in Seattle (p. 57).



The unsymmetrical arrangement of a street in Essen. This and the upper view on Pl. 58 are from photographs and notes by Mr. Harold M. Lewis (p. 222).

According to the London standard two motor cabs will offer no more obstruction to traffic than one horse-drawn cab, five motor omnibuses no more than three drawn by horses, and seven fast motor trade vehicles no more than two slow one-horse vehicles of the same class.

While increased speed and flexibility may tend to relieve congestion, they are also likely to add to the dangers to pedestrians and increase the damage from collision. That this is the case appears obvious from the increasing number of accidents in city streets. Statistics upon this subject have been collected, and although those taken from different authorities show some discrepancies and there frequently is doubt as to which to accept, they all confirm the statement that there has lately been a great increase in the dangers attendant upon the use of public streets. Statistics as to fatal accidents in the streets of the six largest cities of the world during the year 1911 show a remarkable difference in the proportion of such accidents to the population.

TABLE IX

FATAL ACCIDENTS IN THE STREETS OF THE SIX LARGEST CITIES OF THE WORLD DURING THE YEAR 1911

CITY.	FATAL ACCIDENTS IN 1911.	POPULATION.	FATAL ACCIDENTS PER 100 000. POPULATION.
London (Met. Dist.)	444	7,181,415 (1910, estimated)	6 18
New York. . . .	423 ¹	4,766,883 (1910)	8 87
Paris. . .	236	2,763 393	8 54
Chicago . .	228	2,185,283 (1910)	10 43
Berlin. . .	143	2,101,933	6 80
Vienna. . .	62	2,085,888	2 97

¹The figures for New York are those compiled by the National Highways Protective Society, which are believed to be reliable. Figures for the other cities are those of the British Parliamentary Committee. This Committee puts the number of fatal accidents in New York in 1911 at 446, which would make the number per 100,000 of population, 9.36, but would still leave New York in its same relative position with respect to the other cities.

While London appears to lead all of these cities in the actual number of fatal accidents, when population is considered the streets of the London Metropolitan District appear to be safer than those of other cities of more than 2,000,000 population, with the single exception of Vienna, while the risk of accident appears greatest in Chicago, with New York second, both of the American cities having a greater proportion of fatalities charged against them than the four cities of Europe, although Paris is very little behind New York in the list.

It is interesting to note the kind of vehicles to which the accidents are chargeable in the different cities. In New York, Berlin and Vienna the greatest number of fatalities were due to horse-drawn vehicles, the proportion of the total due to them being, respectively, 40, 37 and 47 per cent. Motor cars and cabs exacted the greatest toll of death in London, with 36 per cent for that city, while in Chicago the greatest number was due to surface railway cars, which caused 41 per cent of the total number of fatal accidents. Motor omnibuses, dangers from which in London have been so frequently commented upon, was third in the list of fatal street accidents in that city, being responsible for 26 per cent, while horse-drawn vehicles caused 32 per cent; but when the number of omnibuses and their mileage are compared with horse-drawn vehicles and motor cars, their capacity for the destruction of human life appears very great. In Berlin, with much fewer omnibuses, five per cent of the fatalities were caused by them.

Studies of traffic congestion, its causes and results, while interesting, will be profitless unless they lead to the adoption of means for prevention. Such preventive means are necessarily limited to two general remedies: increasing the capacity of roadways by widening existing and creating additional streets, and the regulation of traffic in order that an increased volume may be accommodated by existing thoroughfares. The former remedy is costly in the extreme, as the busiest thoroughfares are naturally in the most intensively developed portions of the city where land values are highest and buildings

are likely to be most expensive. The second remedy is, therefore, the first to be applied, and the disposition first to resent and finally to accept and commend such regulation has already been noted in this chapter. Drivers soon learn that their irresponsible movement at will from one side of the roadway to the other, turning within the block or in such direction as may seem easiest to them, causes delay to themselves as well as to others. They soon find out that it is better to pass around congested street intersections than to try and force their way through them; that regular stoppages to permit the passage of vehicles on cross streets will ultimately save time. The simplest device appears to be what is known as the "block system," under which all traffic at important crossings is periodically halted in order to allow that on the cross streets to proceed. When the blocks are very short and each crossing is regulated independently of the others, there are still very annoying delays, passage across one street being frequently permitted just in time to allow the driver to be caught by the stoppage at the next cross street. An attempt has lately been made on Fifth avenue, in New York city, to treat from six to eight blocks as a unit. A police officer is stationed at each of the cross streets. Some of these streets will be of such importance that they should control the movement on the others. When the avenue traffic is halted at the controlling street, a master stanchion or semaphore is set at "stop" at that street and a similar signal is at once displayed at each of the other cross streets, so that there is free movement across the avenue at all of the streets within the section. When the delayed vehicles at the controlling cross street have been passed, the "go" signal is displayed at each crossing and there is free movement along the avenue for the entire unit of control.

The periods during which traffic is stopped on the cross streets vary from 90 to 110 seconds and on the avenue from 40 to 50 seconds. It is estimated that the adoption of the larger unit of control has reduced the average time required for a motor car to travel the 1.7 miles along Fifth avenue

between Twenty-sixth and Fifty-eighth streets by from four to five minutes. When the regulation of traffic was first undertaken the efforts of the police were chiefly directed to stopping vehicles, but, as they have gradually become more proficient and have acquired a better appreciation of the real purpose of traffic control, their aim has been to keep the traffic moving. The raised hand to direct a stop is less frequent, while the arm motion to go ahead is more often seen. The same results are noticeable in the movement of the surface cars. On a very busy street in Brooklyn, where there is a constant procession of cars, many of which loop about a triangular block and return, the round trip time from one point to this loop and back, a total distance of one and a quarter miles, has lately been reduced from 24 to 19 minutes.

The varying custom in different cities, and even in the same city, as to the side of the cross street at which surface cars and omnibuses shall stop to take on and discharge passengers has been the cause of much confusion and delay and of not a few accidents. The far-side stop has been the general rule, except where the cross street is also occupied by a railroad, when the cars stop at the near side, or frequently at both sides. Many cities have lately adopted stringent rules as to the stopping place for surface cars and omnibuses, and have painted on the surface of the pavement the spaces within which passengers may stand and upon which vehicles may not encroach. New York has lately adopted the near-side stop for all crossings, and the records of the Public Service Commission show that for the first three months during which the new regulation was in force there was a decrease of 1185 accidents from the number during the corresponding three months of the preceding year, although during the first month there was an increase of 158 in the number of accidents to those boarding cars, owing to the fact that, not being accustomed to the new rule, they waited at the far side and then attempted to board moving cars.

Another regulation recently adopted by the New York police has to do with the left-hand turn. When traffic is moving

along a street in both directions it is evident that a left-hand turn into a cross street will result in interference with the line of vehicles moving in the opposite direction. One wishing to turn to the left is, therefore, obliged either to leave the line of traffic by turning to the right, pass around the block

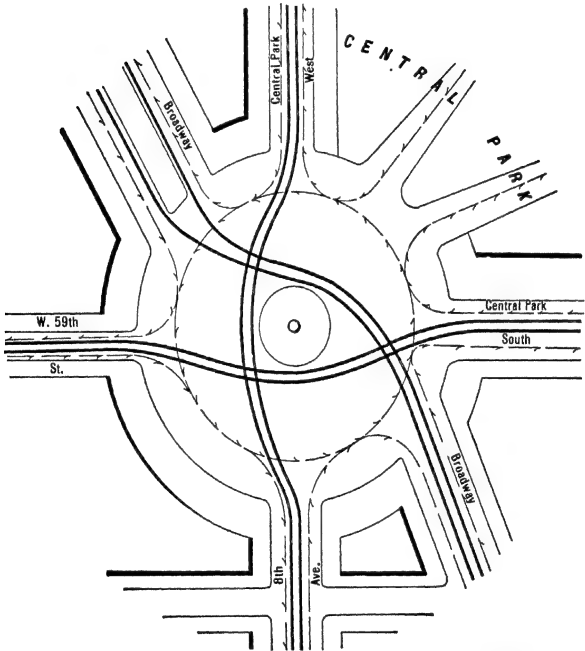


FIG. 49.—Diagram showing the gyratory system of traffic regulation as applied to Columbus Circle, New York.

through the next parallel street and then wait for the release of traffic on the next cross street; or he may turn into the middle of the roadway at the crossing of the street he desires to enter and wait there until the traffic block is removed as to the cross street. If he is within the street intersection, his turn

to the left will involve no delay whatever to the cross-street traffic when released. Where there is considerable open space at the junction of several streets the gyratory system of traffic movement has been very successfully employed. A good example of this is afforded by Columbus Circle, New York (Fig. 49). This plan has been described fully by Mr. Unwin and Mr. Triggs in their books on city planning, and they have

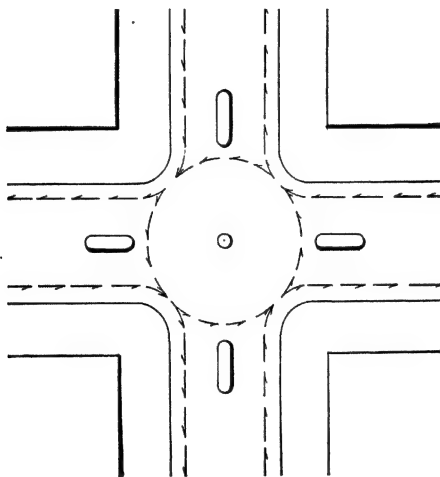


FIG. 50.—Plan showing proposed adaptation of the gyratory system of traffic regulation to the intersection of two 100-ft. streets with 55-ft. roadways.

given diagrams showing its adaptation to specific cases and the great reduction in the number of possible collision points which would result. It is said that this plan was first tried at Columbus Circle in 1905 at the suggestion of Mr. William P. Eno, of Washington, whose efforts to have it adopted in Paris and other large cities have been quite successful. Mr. Eno has lately urged its adaptability to rectangular crossings of important streets, the movement of vehicles being indicated by Fig. 50, which shows the crossing of two streets each 100 ft.

wide with roadways of 55 ft. It is urged that this would entirely do away with the alternate stopping and releasing of traffic, and permit continuous movement. The mechanical control of the movement of vehicles at crossings has been proposed, the approaching vehicle automatically setting a signal before it enters the intersection, thus doing away with the need of a police officer; but the practicability and efficiency of this method have not yet been demonstrated, and the average driver will always have more respect for a police officer than for a semaphore.

But it is not only the moving traffic that must be taken into account, that needs regulation and for which provision must be made. The great number of standing or waiting vehicles offer a serious obstruction to free movement and tax the roadway capacity to the utmost, and this number appears to have been greatly increased since the motor car came into general use. At railway terminals, large hotels, high-class places of amusement and shops the number of standing cars is so great that the available roadway is very much restricted and in some cases special provision has been made for their accommodation beneath the street surface. The motor cars occupy less space than horse-drawn vehicles, but, when standing close together along the curb, they are unable to turn out of the line. When the street width is sufficient they are often required to take a position at an angle of about forty-five degrees with the curb, as shown in the view of a street in Seattle where one side is wholly given over to the parking of cars (Pl. 57, p. 211). This plan would be obviously unfair in the case of a street devoted to shops or certain other kinds of business, as the space next to the curb on one side of the street is constantly obstructed so that vehicles cannot approach it. In streets of exceptional width, as in the case of Broad street, Philadelphia, the cars are parked in the middle of the roadway in a position at right angles to the axis of the street. A great many cars can be accommodated in this manner and any one of them can readily leave its position, however closely they may stand. The

assignment and regulation of public cab-stands has been a troublesome question in many cities. Hotels have frequently let the space in front of them for this purpose, thus deriving a very substantial revenue from the rental of a portion of the public street to which they have no right whatever except that of access enjoyed by every abutting owner. The hotels claim that their purpose was the protection both of their guests and of the owners of the cabs, the hotel management becoming responsible to the former for the character of the service and the prevention of illegal charges and to the latter for the collection of their fares, and that they could not exercise proper control in the absence of some contractual relation between them and the cab-owners. Cities have lately exercised more effective control over public cabs, and have designated places where stands may be established and the number of cabs allowed at each stand. In European cities such stands are frequently located in the middle of the street, where roadways are of sufficient width, and the cab at the head of the line is the one to respond whenever there is a call; but this arrangement has not yet been adopted to any great extent in American cities. Most of the modern railway terminals have made provision for standing cabs within the lines of the buildings and at the Grand Central Terminal in New York, space under the adjoining streets has been rented from the city in order to provide space in addition to that set aside for the purpose on the railroad property.

It may be asked what this subject of street traffic and its control has to do with fundamental city planning. Is it not a question of administration rather than of planning? It may be: but one of the most important duties of the city planner is to make the solution of such problems of administration easy, or at least not impossible. Regulation of traffic by its diversion into other streets might be possible, if other streets of adequate capacity were available. Standing vehicles may be assigned to specific locations provided the roadway width is sufficient to permit the assignment of such space without serious inter-

ference with moving traffic. Further than this, it may be found that desperately bad traffic conditions may be improved by a modification of some of the street details, such as a better subdivision of the street into roadway and sidewalk spaces, so that the more costly remedy of street widenings or the cutting through of new streets may be avoided for a time at least. A careful study of the changes which have lately taken place in the character, volume and speed of street traffic, and the manner in which it can be regulated and controlled, is essential if we are to plan wisely for the future.

CHAPTER XII

STREET DETAILS—UTILITY AND ADORNMENT

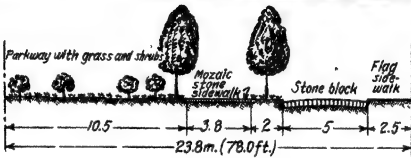
WHILE the working out of a general plan for the streets and roads of a city and its environs is a task of fundamental importance, upon the successful performance of which will depend in large degree the orderly development of the city, the unobstructed movement of its traffic and business, the adequacy of the approaches to and exits from the town, and while this street system forms the general groundwork of the city plan, much more remains to be done. The ground plan may be admirable as a whole, the streets may be of generous width and good alignment and may be skilfully located with respect to the topography, and yet their traffic capacity may be less than it might be owing to bad proportion of roadways and sidewalks; movement along them may be seriously impeded by useless obstructions; roadway pavements may be unsuited to the character of the traffic or to the grades; injudicious tree planting or entire absence of planting may make them bare and unattractive; lamp posts and street signs may be conspicuously ugly; unlawful occupancy of the sidewalk spaces by abutting owners may interfere with pedestrians and produce a ragged and unsightly appearance; hideous bill-boards and gaudy façades may offend both residents and visitors; inadequate lighting at night may render the streets gloomy if not dangerous, while a riot of inharmonious color in electric advertising signs may proclaim the bad taste and vulgar commercialism of the people. There are many details of street arrangement and design which are worthy of the most careful study. Nor, when these details have been fully worked out for one street or even for one street of each class, can that particular

method of treatment be adopted for all streets, or for all streets of a certain class or width. The designer cannot complacently say: "There, that part of the city plan has been carefully worked out, and here is a design, the result of careful study, in accordance with which the streets of the city are to be laid out and constructed. Use this standard plan whenever a new street is to be improved." Yet that very course is being followed to day in many cities. Long, straight streets at fixed intervals, each exactly like the others in dimensions and arrangement, lined with interminable rows of houses of similar design, material and color, make the residential districts of our cities so much alike that without street signs and numbers many city dwellers would find it extremely difficult, if not impossible, to locate their own homes. There has lately been something of a reaction against this monotony of treatment with a tendency in some places to go to the other extreme. An avoidance of identical treatment of different streets has not seemed sufficient to some designers and an unsymmetrical arrangement of the same street has been urged and adopted by some distinguished authorities; not only a variation in the treatment of different parts of the same street, which is usually pleasing, but a different treatment of the two sides of the street, a single roadway being placed near one side, bordered by a narrow footway, while wide walks, shrubbery, grass and trees are placed on the other side. There are special cases, such as side-hill streets, or where the property on one side is devoted to business and that on the other side to residences, where the reason for such treatment is obvious but where the improvement and use of the two sides of the street are similar and where no topographical conditions suggest such unsymmetrical treatment it is difficult to understand why it was resorted to. It sometimes happens that trees have been set out and have grown to good size before the street has been built upon, or the houses on one side may have been set back from the street line, and a widening of such a street becomes desirable. By resorting to an unbalanced or unsymmetrical treatment such a widening of the road-

way or two roadways of different widths can be adopted without the destruction of the trees. In such cases an irregular or unconventional arrangement is clearly advisable, even though the reason for it may not be apparent after the completion of the improvement. But where a single line of young trees occupies one side of a roadway and the sidewalks on the two sides of the street are of different widths and treated in a different manner, it appears as if the designer of the street had been guided by a passion for irregularity as strong as was the passion for sameness on the part of those who made the plans for most American cities, or as strong as the passion for standardization which is so apparent in business and in civil administration to day.

This tendency to avoid formal symmetry and geometrical pattern in the city plan is especially noticeable in the work of the German planners, while the French practice still seems to adhere to the simple dignity of classical design, and the same ideas appear to prevail in most of the designs for civic centers and important plazas in American cities, so many of which have lately been proposed. Examples of the German tendency to irregularity are found in Essen, where the roadways are frequently placed off the center line of the street, giving sidewalks of different widths, a paved walk close to the building line on one side and generous planting spaces being provided in front of those on the other side. While this adds pleasing variety to the street, it appears to make a sharp distinction in the treatment of the two sides which must necessarily affect their desirability for residential purposes, a discrimination which would probably be vigorously resented in an American city (Pl. 57, p. 211, and Pl. 58).

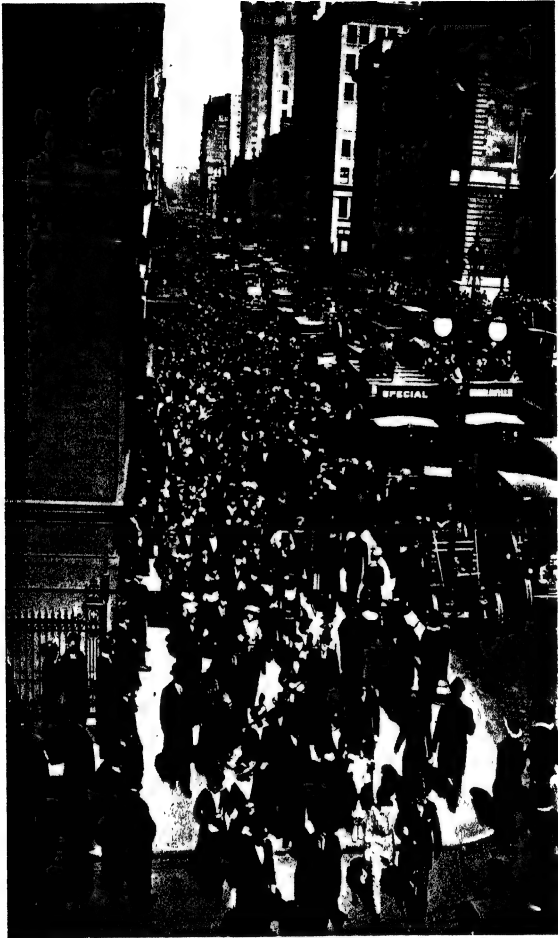
Mr. Unwin protests against the adoption of a minimum street width and the tendency to standardize street dimensions. Perhaps there is good ground for this protest, as nothing will more certainly tend to make a city monotonous or deprive it of local interest than to impose upon it many miles of streets of perfectly regular width and of uniform treatment. A like



Another example of the treatment of streets in Essen (p. 222).



A wide sewer inlet in Pasadena, where the rainfall is sometimes very heavy. Reproduced by courtesy of the *Engineering Record* (p. 242).



Fifth avenue, New York, on Easter Sunday; street 100 ft. wide; roadway 55 ft.; sidewalks $22\frac{1}{2}$ ft., no surface railway tracks. From photograph by Mr. Melvin S. Wells (p. 228).

protest may well be made against standardizing the treatment of streets of the same width. A justification for fixing a minimum street width and for making that width a fairly generous one, at least in American cities, is the absence of authority to impose limitations of height and of the proportion of the lot which may be built upon. If it is possible to develop any section of the city with solidly built blocks, three, four, five or more stories in height, it is quite obvious that adequate light and air and even sufficient street capacity will not be provided if the streets are too narrow, and the only safe plan may be so to fix street widths that whatever may happen, whatever may be the character of the development that takes place, there will still be sufficient light and air to make decent living possible and traffic congestion may be avoided. If, however, the height of buildings and the proportion of the lots which they may occupy may be restricted for any particular section, a very material reduction in the street width may be permitted. Similarly if business has already gained a foothold on one side of a street and it is desired to preserve the other side for residences, a different treatment of the two sides of the street would tend to the accomplishment of this result. Several examples of such treatment are to be found in Toronto, but not to the degree indicated in the views of streets in Essen.

Some writers on city planning have attempted to prescribe the proper proportions of a "place." It is argued that a square shape should be avoided and that it should be made oblong, the length and width bearing some definite proportion, the length, however, not being greater than three times the width. It would scarcely be safe to adopt such a rule. The picturesque features and the charm of every one of these "places" which are to be found in old-world cities depend not so much upon their shape and their dimensions as upon the character of the buildings by which they are surrounded. It is quite apparent that an over-large "place" will dwarf the buildings around it, and that a mass of towering structures built around a "place" or square of limited area will rob it of its dignity. It is quite

improbable that the most famous "places" of Europe were laid out as they are to-day for the reason that the particular size and shape which were adopted were believed to be most effective or artistic. These "places" were usually markets about which buildings had grown up, and it is highly probable that the dimensions and arrangement of many of them which are so much admired are the result of accident rather than design. The markets were the chief centers of activity and the most important buildings were naturally built about them. Good architecture and thorough work were the rule in those days, and the result has been a very happy one.

Street details may be divided into those the chief purpose of which is utility, as tending to promote convenience and safety, and those of which the aim is adornment or to add to the attractiveness of the city. There will be some of these details where both are sought, but neither should be sacrificed to the other. To be convenient and safe a street or the junction of several streets need not be ugly and badly proportioned. If a dignified or picturesque effect is sought to be attained in such a way as to involve public inconvenience or danger the purpose will not be realized, and a painful impression will be produced. A street may be well lighted so far as the amount of light is concerned, but this may be accomplished by the use of ugly lamp standards or by the suspension of the lights from overhead wires supported by poles; graceful lamp standards may be introduced which will be attractive by day, but they may be so placed and the illumination may be so meagre as to produce unsatisfactory results at night.

The alignment and grades of the streets will have been determined by the original street plan, but certain details at street junctions may often be subsequently adjusted and improved in the interest of safety, convenience and appearance. The most awkward intersections are those where there is an offset in the crossing street involving two right-angled turns; while an enlargement of the street area is desirable at all intersections where any considerable traffic may be expected,

it is especially necessary where there are offsets. Such breaks in the continuity of a street have the advantage of affording opportunities for interesting street pictures and advantageous sites for buildings which require ample light and air and which are worthy of sites which enable them to be seen to advantage. Several methods of treating offset intersections are shown in Fig. 25, p. 112, from which it will be seen that by the acquisition of a slight additional area very pleasing results can be secured. At acute-angled intersections the street lines may be deliberately shifted in order to break the alignment without the slightest embarrassment to traffic, while the streets will acquire added interest and some admirable sites will be provided for important buildings, as shown by details J and K of Fig. 25. Where two important streets intersect each other either at right angles or obliquely, an enlargement of the area is always desirable, the open spaces being either rectangular or circular in form and occasionally irregular in shape. The circle is best adapted to cases where five, six or more streets come together, when it can be made a conspicuous feature of the general plan. Among the symmetrical places of this kind are the Place de l'Etoile with its twelve converging avenues and the Arc de Triomphe in its center, and the Place de la Nation, where ten streets center at the bronze group representing the Triumph of the Republic, both of these places being on what might be called the main axis of the city of Paris. Other examples are the circular place at Indianapolis with a diameter of 493 ft. and the tall shaft of the Soldiers' Monument in the center, whence the four principal streets of the city radiate, and Columbus Circle in New York, 430 ft. in diameter, where six important streets join at the Columbus Monument (Fig. 49, p. 215). Washington has many open spaces at the junctions of its great diagonal avenues with each other and with the streets of the rectangular system. These, however, are not treated as traffic centers but as parks, and are planted and adorned with fountains, monuments or statues in a manner suited to a great national capital.

It is the usual practice of cities to fix by ordinance the roadway and sidewalk widths of all streets, and the roadway is commonly given a width of approximately one-half the total street width, the remaining half being divided between the two sidewalks. In New York such an ordinance prescribes the following widths:

STREET WIDTH	ROADWAY WIDTH
20 to 50 ft., not occupied by a railroad.....	60% of street width
50 to 60 ft., not occupied by a double-track railroad..	30 ft.
60 to 66 ft. 8 in., occupied by a double-track railroad	50% of street width
66 ft. 8 in. and over.....	80% of street width less 20 ft.

Standards for the subdivision of street widths are undoubtedly desirable rather than leaving these details to be fixed according to the whim of the developer or the notions of the engineer in each particular case; but the standards adopted have not often been the result of a careful study of the needs of traffic of various classes. One line of vehicles requires for free movement about eight feet of roadway width. Two lines in each direction, or one standing next to the curb and the other moving, will therefore require 32 ft., although 30 ft. is generally sufficient for the purpose, and this should be the minimum width for business streets without railway tracks. Provision for an odd number of lines of traffic is not justified, as the odd or middle line would be obliged to accommodate vehicles moving in both directions and the interference would be so great that it would be of little use. In case there are railway tracks in the street special treatment will be necessary. A single-track railroad will use about nine feet of width, and if provision is to be made on each side for a single line of vehicles in addition, whether standing at the curb or moving, at least 25 ft. of roadway will be required. The New York city ordinances require not less than 30 ft. where there is a single-track road, this allowing for exceptionally wide vehicles such as moving vans, ice wagons or coal trucks standing at the curb without inter-

fering with the free movement of cars. In the case of double railways the space required for them is about 19 ft., and a single line of vehicles on each side would require a total roadway width of at least 35 ft., and for two lines of vehicles 51 ft. The New York ordinance requires not less than 40 ft. where there are double-track railways. This is somewhat more than is needed to accommodate one line of vehicles on each side of the tracks, but not enough for two lines.

While in nearly all cities there are some streets whose roadways are inadequate for the traffic which they attract, there are a far greater number whose roadways are much wider than required. This means a needless expense to the owners of the abutting property for the original improvement and a serious burden for the city in maintenance, repairs and renewals. Street traffic gradually increases as the abutting property is improved and the general business of the locality increases. While it is wise to lay out streets of sufficient width to permit as intensive development of the adjoining property as the ordinances will allow, there is no good reason for the laying and maintenance of an area of pavement which is obviously greater than will be required for some years to come. A residential street 6 ft. in width will not need a roadway 30 ft. wide unless it is called upon to accommodate a considerable amount of through traffic. Twenty feet or even less would in most cases be sufficient for the initial improvement. This saving of ten feet in the width of the pavement will mean a substantial decrease in the burden of assessment for the first improvement, probably as much as \$30 for each 25 ft. of frontage. It may be that additional roadway width will not be required during the lifetime of the first pavement or even of two pavements, sometimes not at all. When more space is needed the curb can be set back and the sewer inlets can be readjusted. When there is such a reduction in width the street appurtenances back of the curb, such as lamp posts, fire hydrants and trees can be so located as to conform with the ultimate position of the curb, so that it may be set back when necessary with a minimum of

expense and disturbance of existing conditions. Such a policy, in case of a reduction of ten feet in width, would save the property owners on a block 700 ft. long about \$1500 in the first cost of their pavement, and the city would save a substantial sum annually for maintenance. When a widening of the roadway is required the cost of the additional pavement can properly be assessed upon the abutting property.

It is impossible to estimate with any degree of accuracy the width of sidewalks which will be needed. In ordinary streets pedestrian traffic varies greatly with the seasons and at different times of day, and in most cases there is an excess of sidewalk space which can advantageously be used for grass, trees and other planting, a stone, concrete or brick walk four or five feet wide being all that is required. In the case of retail shopping streets, however, more generous sidewalks are needed, while in such narrow thoroughfares as Hohe strasse in Cologne and Kalver straat in Amsterdam, the busiest shopping streets of these cities, the pedestrians use the roadways as well as the sidewalks, especially in the evenings. In the financial and office districts of London, New York and other large cities the same use of the entire street by pedestrians is often seen during the busy hours of the day, when vehicular traffic is practically excluded. Where there is special need of sidewalk capacity on narrow streets the roadway is sometimes reduced to a width which will accommodate but a single vehicle and the traffic is confined to a single direction. It is apparent, therefore, that no general principles can be laid down as to the relative amount of roadway and sidewalk space which will be required. The best that can be done is to proportion them according to anticipated needs, with some latitude, where possible, for future adjustment of the curb line to suit changing conditions; but it would be unreasonable to provide for the throngs that are likely to flock to a certain street on one or two days in the year as, for example, for the crowds on Fifth avenue, New York, on a pleasant Easter Sunday (Pl. 59, p. 223).

Exceptionally wide streets, of which there are some in every

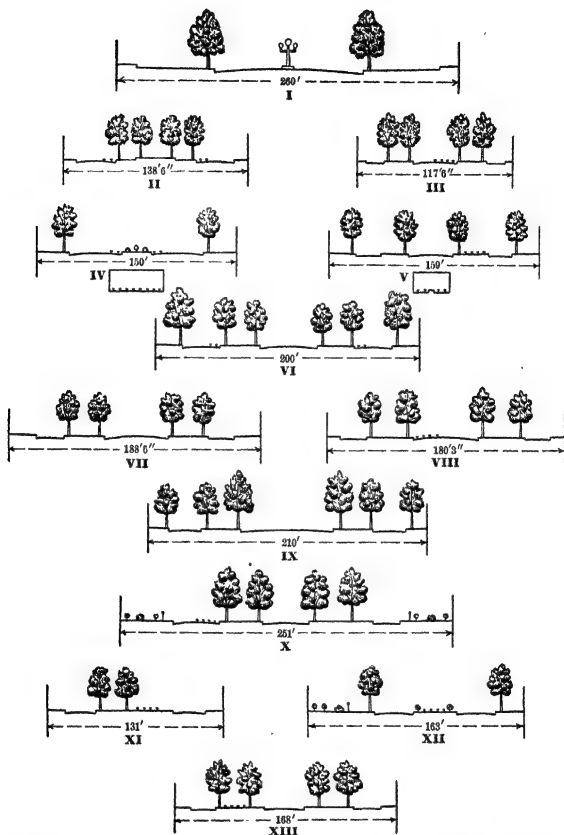


FIG. 51.—Showing examples from various cities of the subdivision of wide streets.

- | | |
|--|------------------------------------|
| I. Avenue des Champs Elysees, Paris. | VII. Ring strasse, Vienna. |
| II. Stubel-Allee, Dresden. | VIII. Avenue Louise, Brussels. |
| III. Adolfe-Allee, Wiesbaden. | IX. Ocean Parkway, Brooklyn. |
| IV. Upper Broadway, New York. | X. Avenus de Tervueren, Brussels. |
| V. Bismarck strasse, Charlottenburg. | XI. Kronprinzen strasse, Mannheim. |
| VI. Queens Boulevard, New York. | XII. Typical boulevard, Berlin. |
| XIII. Boulevard between Lille and Tourcoing. | |

large city, present a special class of problems. It is impossible to formulate any but the most general principles by which plans for their subdivision should be governed. Not only do the conditions vary in each particular case, but there is a great opportunity for the exercise of personal judgment and taste. A discussion of the different conditions which may exist and the different ways in which the same problem may be solved will be of less value than a few examples of the treatment adopted for a number of wide streets in some of the great cities of the world. Such examples are shown in Fig. 51. The simple dignity of the Avenue des Champs Elysees, 260 ft. wide with its single roadway 114 ft. in width, renders it one of the most notable streets in the world, if it is not indeed the most notable. It was a daring treatment, however, which could only be successful in such a street with the spacious Place de la Concorde at one end and the great Arc de Triomphe at the other. Streets of this exceptional width are usually divided into two or three roadways, one of which is commonly restricted to pleasure traffic. The Grand Boulevard and Concourse in the Borough of The Bronx, New York, notwithstanding its pretentious name, offers an example of a great excess of roadway capacity with an almost complete absence of the decorative features which its width would suggest and permit. A plan for its rearrangement has been devised which will attempt to correct this defect. Both the present and proposed arrangement are shown by Fig. 52.

Surface railway tracks are frequently located in streets of this kind and their position varies greatly, as will appear from the illustrations. While such tracks are sometimes placed in the wide roadway which is especially adapted to pleasure traffic, it is better to put them in the side roadways. Two tracks are in some cases placed in a single one of the side roadways, a serious objection to this arrangement being that while some of those wishing to use the surface cars may reach those going in both directions without crossing the central driveway, all who live or do business on the other side of the wide street

are obliged to cross the central and one side roadway in order to reach or leave cars going in either direction. Railway tracks are occasionally placed in one of the parking spaces, but it is difficult under such circumstances to maintain the grass in good condition, and the space used for this purpose is neither a successful parked area nor a simple railroad right of way. A conspicuously successful instance of this treatment is found in Bismarck strasse, Charlottenburg, where between the mu-

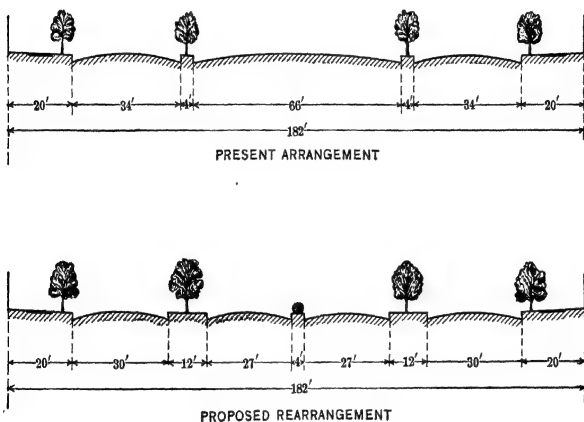


FIG. 52.—An instance of excessive provision for roadways on a very wide street to the exclusion of parking features. The proposed rearrangement corrects this in part, but might well have gone farther.

nicipally owned and operated surface railroad tracks excellent turf is maintained and the space in which the tracks are located is edged with flowering plants, and for a portion of the distance by vines planted at intervals and festooned to standards placed midway between them. Such success is so rare, however, as to render the plan an unsafe one to follow under the conditions which usually prevail, especially where the railway is owned and operated, not by the municipality but by a public-service corporation, the chief interest of which is naturally in dividends,

which will be reduced by expenditures for the sole purpose of making its right of way attractive. An instance of an elevated railroad located in the central portion of a very wide street with space for planting on each side of the structure has already been noted. (Fig. 11, p. 79 and Pl. 10).

A special problem is presented in the subdivision of boulevards, especially those which are 150 ft. or more in width, some possible solutions of this problem being shown in Fig. 51. A report made by Olmsted Brothers to the Essex County Park Commission of Newark, N. J., in June, 1915, contains some interesting observations on this subject. They divide boulevards into three classes, depending, not upon their width, but upon whether they have one, two or three driveways. Those of the first class may vary from streets 100 ft. or even less in width, with such provision for trees or shrubs as the width may permit, to streets as wide as 150 ft., with one broad driveway and wide grass borders with a double row of trees on each side. Boulevards of the second class are said to be the most popular with the owners or occupants of abutting real estate. The central space between the two driveways can be treated in a variety of ways and in a more ornamental manner than the side grass plots in cases where there is a single driveway. It is possible to introduce the two driveways in boulevards not more than 100 ft. in width, but the narrowness of the drives and planting strips are likely to make such a boulevard "look like a big, handsome idea meanly carried out." One hundred and twenty feet is said to be about the least width at which such an arrangement can be successfully employed. Boulevards of the third class involve a good deal of expense, and the central or wide driveway is usually devoted to pleasure traffic and, where possible, the grades of this driveway and those of the cross streets are sometimes separated. In the report referred to there is a suggestion for the treatment of a parkway 400 ft. in width with twelve rows of trees, four railway tracks, and six roadways, the subdivision being as follows:

12 tree strips, each 6 ft. wide.....	72 ft.
2 sidewalks, each 8 ft. wide.....	16 "
2 promenades, each 12 ft. wide.....	24 "
2 roadways for local automobile traffic, each 24 ft. wide	48 "
2 roadways for horse vehicles, each 24 ft. wide	48 "
2 automobile roadways for fast traffic, each 26 ft. wide .	52 "
2 spaces for local electric surface railways, each 12 ft. wide	24 "
1 double-track rapid-transit railway	28 "
2 spaces for slopes and retaining walls.	76 "
3 lines of dividing walls and curbing, each 4 ft. wide. .	12 "
400 ft.	

Among the most important adjuncts of the city street are the various structures beneath the surface. These being out of sight and little in evidence, the importance of their location

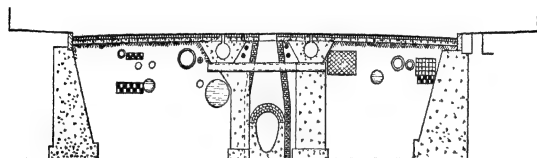


FIG. 53.—A typical section showing the sub-surface structures in Broadway, New York.

and control is not so apparent to the casual observer as are the more obtrusive but not more important structures above ground, except when the street surfaces are torn up for the repair of old or the installation of new sewers, pipes or conduits. The work of building them is often so indifferently performed that repairs or renewals are frequently required, and their arrangement is often so unsystematic that the work of repair or renewal is slow, costly and attended with great public inconvenience and discomfort. A typical instance of the great number of underground structures is shown by the section of Broadway, New York (Fig. 53). It is often urged that the only effective remedy for this nuisance is to build subways for the accommodation of all sub-surface structures and thus put an end to

the constant mutilation of street pavements. The cost of doing so would be enormous, to say nothing of the great disturbance of business, and it is doubtful if such an undertaking would be justified except in connection with the creation of a new street or the widening or reconstruction of an old one.

The first subways for the express purpose of accommodating pipes and mains were built in London. In 1846 the Metropolitan Board considered the cutting through from Longacre to Covent Garden Market of what is now known as Garrick street, which was completed and opened to traffic in 1861. In the history of London street improvements by Mr. Percy J. Edwards will be found the following relating to this undertaking:

“Before forming the new thoroughfare the Board directed its attention to the adoption of some means for obviating the expense and inconvenience attending the breaking up of the pavement for the repair of pipes, mains, sewers and other underground works. The Board issued advertisements offering six premiums, the highest being one hundred guineas and the lowest five guineas, for the best designs for laying out of the surface of new streets and for the disposition of the vaults, sewers and other underground works, with the result that 39 designs were sent in. The Board decided to give practical adaptation to some of the designs, and accordingly arranged for the construction under the new street of an arched subway for gas and water mains, etc., the subway being $7\frac{1}{2}$ ft. in height by 12 ft. in width, in addition to which 14 arched side passages for house-service pipes, together with proper cellarage on each side of the street, were constructed.” In the creation of Southwark street on the south side of the Thames, completed in 1864, Commercial road, opened to the public in 1868, Queen Victoria street, opened in 1870, Northumberland avenue in 1876, and other subsequent improvements, provision was made for the inclusion of pipe subways in the original construction of the streets. The pipe subways of London are partly under the control of the London

County Council and partly under that of the Corporation of the City of London. Those of the London County Council occupy 16 separate streets, in three of which there are double subways, or one on each side, the total length of all sizes amounting to 35,940 ft. Those under control of the Corporation of the City of London occupy 15 different streets, in one of which there are subways on both sides, the total length of all sizes being 8,124 ft. The number of underground structures in the streets of London are fewer and they are smaller than in those of many American cities. For instance in the pipe subways under the control of the Corporation of the City of London 75 per cent of the total length is occupied by but one water main, while 69 per cent of the total length of water pipe is 5 in. or less in diameter and none of them exceeds 14 in. Forty-four per cent of the total length contains but one gas pipe, and of the total length of gas pipe 73 per cent is 8 in. or less in diameter with a maximum of 24 in. In three typical subways in the busiest streets of London, the inside dimensions in each case being 12 by 7½ ft., the average of the combined cross sectional area of the pipes and conduits was found to be 6.17 sq. ft. At two typical sections of Broadway, New York, the average combined area of similar structures was found to be 44.05 sq. ft., or more than seven times as great, while at two places in Canal street the average was 30.7 sq. feet, or five times as great as in the London subways.

Although London began building pipe subways in 1861 their total length is now less than eight and a half miles. In explanation of the very limited mileage which has been constructed it is said that only when a new street is created or an old street is widened or straightened is any attempt made to build pipe subways, and that the expense of constructing them in existing streets simply for the accommodation of underground structures would be so great as to be out of proportion to the benefits to be derived. Nottingham was the first city to follow the example of London in providing subways for the accommodation of underground structures, this having been done in

Victoria and Queen streets in the year following the construction of the first subway in London; but the total length of streets provided with this construction is very limited, not exceeding about half a mile. Mr. Arthur Brown, the borough engineer, in a paper read before the Incorporated Association of Municipal and County Engineers in April, 1892, says: "To show the value of such works in the street called Victoria street, in which is situated the general post-office, there are, besides the gas and water pipes and connections, no less than six pipes containing telegraph wires in this subway, and not one single stone was disturbed in this carriageway for twenty-five years, and in that period not one single penny was spent in repairs on the street."

Except for one pipe subway 2040 ft. long in St. Helens and a short piece 345 ft. long in Glasgow no other construction of this kind has been undertaken in Great Britain, while, so far as the author knows, the only subway built for the exclusive accommodation of pipes and conduits on the Continent is a short one in the Via Dante in Milan.

One of the advantages which have been claimed for the large sewers of Paris is that they can accommodate the various pipes and wires which are ordinarily placed beneath the roadway, thereby avoiding the disturbance of the pavement. It was formerly the practice to place gas mains in the sewers, but owing to several explosions, attended by serious and fatal results, it was decided forty or more years ago not to admit gas pipes to the Paris sewers. These pipes, together with electric light and power conductors, are now placed under the sidewalks, and the engineers in charge of the sewers say that they still consider the former practice dangerous and never permit gas pipes to be placed in the sewers, which, besides providing for drainage, accommodate the telephone and telegraph wires, the water mains for the dual service, pneumatic tubes and hydraulic power pipes. A few years ago frequent reference was made to the admirable condition of the streets of Paris, and it was claimed that this was due to the fact that all of the underground structures were

accommodated in its roomy, well ventilated and well-lighted sewers. But Paris appears to have been going through a period of underground railway and other construction. A special despatch to the *New York Times*, dated June 20, 1914, and published the following day, commented upon conditions in the streets of Paris caused by settlements and the caving in of pavements following severe storms and resulting from excavations for underground railways and other sub-surface structures. It was stated that in the Boulevard Haussmann the pavement opened and a taxicab was swallowed up and that in another street fifty persons were engulfed when the sidewalk suddenly disappeared. It was also said that four times during the preceding six months the pavement in the Rue St. Honoré had been torn up and replaced: first, to lay a new gas main; second, to remove an old gas main; third, to lay new drain pipes; and fourth, to put down new tramway lines. The engineers and city officials were said to be offering diverse explanations, one blaming the subsoil, loosened by the floods of 1910, another the settlement caused by the bursting of sewers, while another accepted the consequences of the storm as a divine visitation. The prefect of the Seine is quoted as making the following statement: "The city is a gigantic mole-hill, undermined in every direction. It is nothing but a labyrinth of railway tunnels, pipes and cables underground, and additions to and enlargements of these disturb the subsoil dangerously. The new subway tunnel is responsible for the disaster. The only remedy is Paris must demolish the fortifications and increase outward. She is now over-congested within her boundaries both above and below ground."

Two exceptionally well-paved cities are Liverpool and Berlin, in the former the street pavements being largely of stone block and in the latter of asphalt, and in neither are to be found the evidences of frequent disturbance of the pavement surface so often seen in American cities. Yet neither of them has pipe subways. It is probable, therefore, that this condition is due to efficient administration under which the various pipes and

conduits are arranged in an orderly manner and are laid with great care, and that when openings are made the surface is promptly and thoroughly replaced. It must also be remembered that, owing to the smaller consumption of water and gas and to the less general use of the telephone and electric light, the size and number of the sub-surface structures are smaller and the number of openings under the same conditions would be less than is the case in American cities.

Perhaps the street details most obtrusively in evidence in the business thoroughfares of the average city are those incidental to the inevitable street surface railroad, usually of the over-head trolley type. No more economical and in many respects no more efficient means of transportation has yet been devised. When the city owns and operates the lines such service is considered as much a municipal activity as the supplying of water or gas or the repairing and cleaning of the streets. It is natural, therefore, that the railway structures, whether on, below or above the street surface, should be considered as appurtenances to the streets. When these railways are owned and operated by public-service corporations under franchises acquired, often in perpetuity and without adequate compensation for the privilege, there is a disposition on the part of the operating companies to regard the use of the streets for such purpose as the best to which they could be put, and to feel that the railways, which undoubtedly serve more people than any or all other means of transit, should not be impeded by other traffic. This view, while generally accepted by the public when applied to publicly owned and operated lines, is not likely to be acquiesced in when they are owned and operated by independent corporations. The tracks themselves, if the rails are of proper shape and are well laid, do not offer any serious obstruction to vehicular traffic. In fact, most vehicles, having the same gauge as the tracks, find movement along them somewhat easier than on the pavement. But the construction is not always as substantial as it might be, the rail heads are frequently of such shape as to offer serious obstruc-

tion to the movement of vehicles, while switches, turnouts and crossings break up the pavement surface very badly and are productive of nerve-racking noise. The most conspicuous feature of the usual type of street railway, however, is the system of overhead wires and the poles supporting them; and in some cases also the heavy feed wires which supply the current. On straight streets with no turnouts the wires, while unsightly, are not always the most conspicuous objects in sight, but at the crossing of two railway lines, where there are curves at several, and sometimes at all, of the corners, the intricate system of supporting wires and those required to give the overhead conductors curves corresponding with those of the tracks fill so large a portion of the field of view that those passing along the street can see little else. At important street junctions, where many different lines of railway center, there is frequently an open space occupied by a statue or fountain or something which is intended to arrest attention and emphasize the importance of this particular spot in the life of the city; but, however well designed this feature may be, and however appropriate its location with respect to the general plan, the overhead wires make such peremptory demand upon one's attention that little is left for other details. On Manhattan Island in New York no such wires are permitted, except that several of the surface lines from the upper side of the Harlem River are allowed to run a few blocks on the island with their overhead conductors in order to connect with some of the important transit routes. Although by their refusal to allow overhead trolley construction the municipal authorities doomed New York to a survival of the horse car long after it had disappeared from almost every other town, this was not too great a price to pay in order to keep the space above the streets unobstructed. The alternative is the underground contact with the slotted rail in the center of the track, although in some European cities one of the running rails is slotted, and the power obtained through it. One advantage of the underground contact is that the track is necessarily more

substantial and the pavement along it can be more readily maintained, although the central slotted rail involves an extra subdivision of the pavement for each track. The construction is also more expensive, as indicated by the relative costs of the different types of railway construction given in the chapter on Transportation (p. 85), and this additional cost would doubtless be prohibitive in small towns or in the outlying districts of large cities where traffic is light. Standards located between the tracks with brackets from which the overhead contact wires are suspended reduce the disfigurement of the streets, but offer serious obstruction to street traffic.

The lighting of public streets and open spaces has been the subject of much painstaking investigation, having for its purpose not only effective illumination but an addition to the beauty of the street. Very attractive and costly lamp standards have been employed on bridges and in front of public buildings and at important street junctions, and sometimes on entire streets, but only lately have attempts been made to provide for all streets standards which, while simply designed and of inexpensive material, are really attractive. A number of the more ambitious designs were illustrated in Volume IV of the *Town Planning Review*, pages 292 to 296, and a number of examples of modern electric light standards and the effective lighting of streets are shown by the illustrations (Pls. 60 and 61, pp. 242 and 243). The illumination of important buildings has also received much attention, and strikingly beautiful results have been obtained by indirect lighting, notably in the case of the Public Library and the Woolworth Tower in New York, while a grand climax seems to have been reached in the illumination of the buildings at the San Francisco Exposition of 1915. Through the courtesy of the New York Edison Company some excellent examples of the recent developments of the art of lighting are shown (Pls. 62, 63, 64 and 65, pp. 244 to 247). An exhaustive paper on the lighting of streets was presented at the International Road Congress held in London, in 1913, by Dr. Clayton H. Sharp.

¹ Proceedings of the London International Road Congress, 1913, paper No 37, by Dr. Clayton H. Sharp.

This paper discusses not only the best methods of distributing the power by which light is produced and the efficiency of different methods of lighting, but also the effect of the character of the street or road surface and the question of whether the chief object of street lighting should be the illumination of the street surface or of the objects in and along the street. It is pointed out that while a clean, dry asphalt or waterbound macadam surface requires relatively little illumination to render objects visible, an asphalted street when wet or oily or a macadam surface which has been treated with oil or tar without the addition of sufficient stone top dressing requires high illumination to produce the same effect. Experiments are referred to which show by actual measurement that the illumination of an asphalt paved street is three times as effective as that of a street paved with stone block, owing chiefly to the better reflecting power of the asphalt surface.

One of the essential though minor adjuncts of city streets are the signs bearing the names of the streets. While they should not be obtrusive, they should still be sufficiently conspicuous to attract the attention of those passing them, whether walking or riding. While not large, they should be so plain as to be easily read. These signs have been made of almost every material suitable for such use, and have been placed in every possible position. The commonest type of sign is the enamelled plate affixed to the corner of a building, white letters on a blue ground being the most easily read. The street names were formerly cut into the stone of the buildings, but they never showed distinctly and in a few years became almost illegible. It is difficult to provide signs which are readily distinguishable at night. When the old open-flame gas street lamp was in general use, street names on glass plates attached to them served the purpose. When electricity displaced gas for street illumination the old lamp standards continued to serve as supports for street signs and in some cases illuminated signs continued to be used, this involving the burning of a gas jet inside of them at night. Some of these signs were of

very good design, but they are seldom used at the present time.

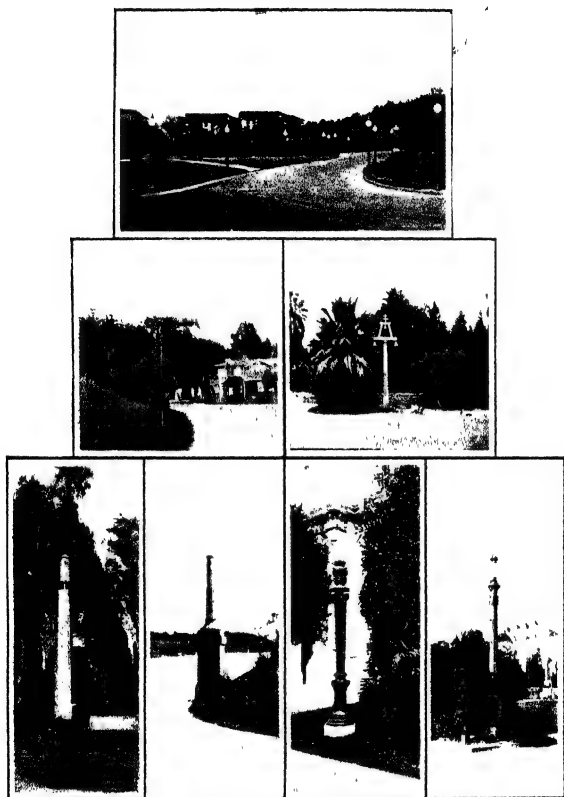
Such details as fire hydrants and sewer inlets are essential, and their efficiency is the first consideration, the former to be readily accessible, frost proof and sure of operation, the latter to take care of surface water during the heaviest storms. To attempt to make the fire hydrant a thing of beauty would probably result in making it ridiculous, and this is even more true of the sewer inlet, which has lately been made less obtrusive. The great gaping openings formerly so common were not only very ugly, but involved a certain element of danger, and there have been instances of children having fallen or having been washed into them; but statements that such casualties were not uncommon are gross exaggerations which have been indulged in by some writers. There is no more utilitarian adjunct of a city street than a sewer inlet, which must do the work for which it was designed. When rainfalls of great intensity are likely to occur these inlets must be of adequate capacity, but this can be done by making the openings longer rather than higher, as in Pasadena, Cal. (Pl. 58, p. 222).

There is no one thing that tends to make a city street as attractive as planting. Well-kept grass plots and well-selected shrubs give streets a certain distinction, but nothing dignifies them so much as rows of fine, healthy trees. As Mr. C. M. Robinson says: "In the mental picture of a beautiful city or village the tree has an inseparable part." Where the streets are only wide enough to permit a single row of trees on each side it has been the custom to place them just back of the curb. Where the buildings are on the street line this may be necessary, but the space about the trees is so completely covered by stone or concrete flags that they have a hard struggle for existence. Even where the buildings are set back from the street line, this habit as to the location of the trees persists. In such cases, if they were placed inside the walk at or near the street line, with turf about them, they would not only thrive better, but the



The upper view is an example of effective street lighting by clusters of incandescent lights on low standards. The lower views show the great improvement which has lately taken place in the design of lamp standards both for special and general use (p. 240).

PLATE 61



Examples of generous street lighting and of the variety of lamp standards found in the towns of the Pacific Coast, many of which are admirably suited to their environment (pp. 240 and 244).

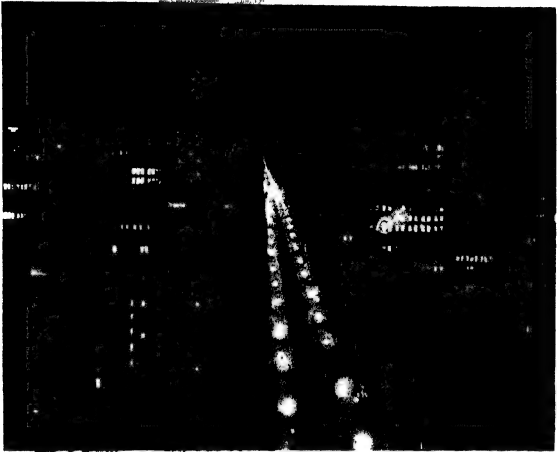
street would acquire added dignity and appear wider (Pl. 66, p. 250). The details in two streets may be identical, the setback of the houses the same, the distance between curb lines the same, and the trees about the same size, yet there is a dignity and an impression of greater width where the trees are set back on the street line which is lacking where they are in their usual places next to the curb. It is unfortunate that tree planting is quite generally left to the real estate developer, who is free to carry out any scheme which seems to suit his fancy, not only with respect to the selection of the kind of trees to be used on each street, but as to their location. Washington is one of the few American cities that has given this matter the attention which it deserves, a consistent scheme of planting having been worked out for each street, and this wise policy has contributed in no small degree to making Washington the beautiful city that it is. As Mr. Charles D. Lay has well said: "Tree planting cannot safely be left to individual enterprise, for a tree out of place is just as objectionable as any other misplaced object." The book by Mr. William Solotaroff devoted to this subject is well worthy the careful study of those who are responsible for the planting and care of trees in city streets.¹

The street details already considered are those over which the municipal authorities have control and which are installed by the city at public expense or by public-service corporations under a certain degree of public control. Most of them are utilitarian in purpose, and the effort to make them attractive has resulted from the higher standard of public taste which has recently been developed. Some of the structures which might be classed as street details have been referred to in the chapter on Public Buildings. Many of the most effective adjuncts of city streets have been supplied by real estate developers, some within the street lines and others on private property. Developments on an extensive scale have been undertaken where

¹ "Shade Trees in Towns and Cities," by William Solotaroff, 1911.

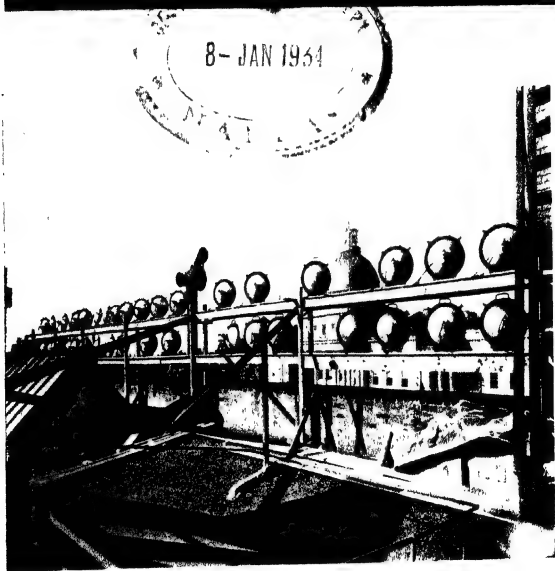
a street plan has already been adopted but, the streets not having been taken over by the city, the owners have been able to carry out their own ideas without the approval of the public authorities. In some instances they have, with little or no departure from a conventional rectangular plan which may have been imposed upon the territory, been able, by the introduction of central parkways, the judicious planting of trees and shrubs, the erection of ornamental columns at the boundaries of the property, the imposition of setback restrictions and stipulations as to the position of buildings with respect to the lot lines, to give a distinctive character to the neighborhood, which has added greatly to its attractiveness and has materially increased property values. Such successful treatment of details is to be found at Forest Hills Gardens, New York, examples of which are shown on Pl. 67 (p. 251). In this development, which is more particularly described in the chapter on Garden Cities, the rectangular plan of the adjoining sections was entirely disregarded, as will be seen by reference to Fig. 59, p. 310. Another of the many examples which might be given is on the other side of the continent, at San Francisco, where the suburban development illustrated by Fig. 60 (p. 314) in the chapter on Garden Cities includes a number of ornamental details which are well designed and executed (Pl. 68, p. 252), and here also are the simple little lamp standards covered with flowering vines. (Shown in Pl. 61, p. 243.)

Some of the most successful attempts to introduce attractive street details are to be found in private streets or places—that is, short streets or courts not recognized by or included in the city plan and over which the developer, and after him the purchasers of the plots, retain and exercise entire control, maintaining at their own expense the roadway pavements, sidewalks, planting, etc. St. Louis is conspicuous for these places, some modest and others quite pretentious. Several views showing their arrangement are illustrated (Pls. 69 and 70, pp. 252 and 254). The nature of the restrictions imposed by covenants between the developers and purchasers of plots are indicated by the



The lighting of Fifth avenue and the high office buildings of lower Manhattan, New York. These and the views on Pls 63, 64 and 65 are reproduced from photographs kindly furnished by the New York Edison Co (p. 240).

PLATE 63



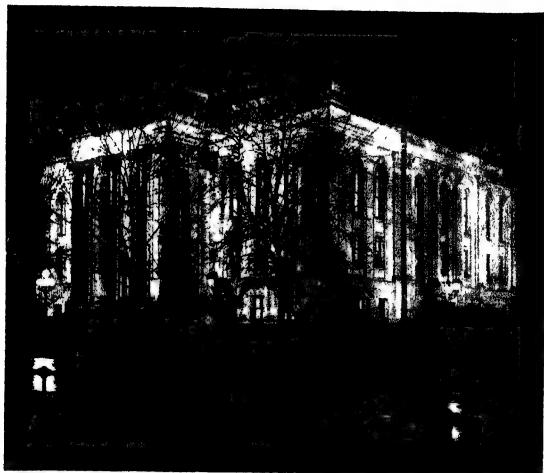
The Boston State House at night and the battery of lights by which it is illuminated (p. 240).

following typical provisions applying to one of the more modest places, which were furnished through the kindness of Mr. John Noyes of the Missouri Botanical Garden:

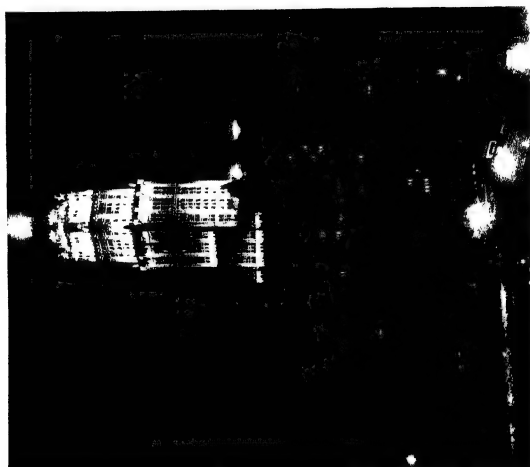
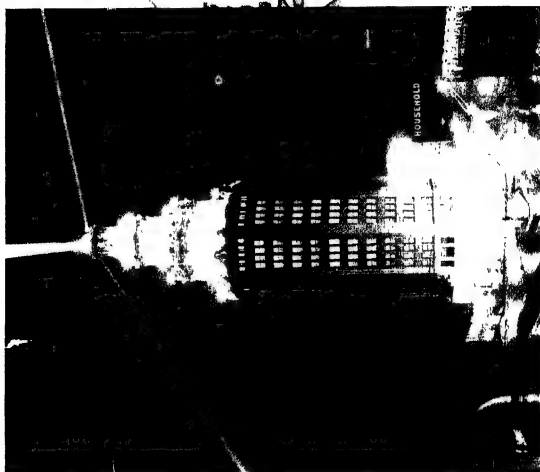
Private residences only may be erected with such stables or other subsidiary buildings as may be appurtenant, in ordinary use in St. Louis, to a private residence. Building lines are established as to all property on both sides of the street, that on one side being 17 ft. and on the other 30 ft. back of the street line, although porches and steps may extend seven feet beyond the building line so established in the former case, and eight feet in the latter. The inner line of the sidewalks or the edge next to the abutting property shall be ten feet outside of the setback building line, so that these ten feet will be added to the space in front of the houses.

In the more ambitious developments, such as Westmoreland Place (Pl. 69), buildings must be kept 40 ft. back of the street lines and may not be less than ten feet from the rear lot line, the width of the lots on this "place" being about 100 ft. and the depth 200 ft. measured to the center line of the rear alley. In one instance there was originally a restriction against the erection of any dwelling costing less than \$6000, which has proved to be an entirely unnecessary provision, as none have been built at a cost of less than \$20,000, and it is said that the most of them were far more expensive. An annual assessment of not more than 50 cents per front foot is imposed upon all of the lot owners to meet the cost of maintenance and care of the trees, shrubs, etc. Conspicuous features of the St. Louis places are their ornamental entrances, several of which are shown in the illustrations. It is unfortunate from the point of view of the city as a whole that these places frequently have no direct relation to the surrounding street system. If they were the continuations of city streets, the entrances would add an attractive feature to the streets as a whole, but one of the chief purposes had in mind by the developers appears to have been the emphasis placed upon them as somewhat secluded colonies of home owners; and while the

fact that they have been placed somewhat off the regular street system is probably fortuitous and resulted from the location of the property available for the development, the fact that they are stumbled upon accidentally adds to their desirability for the particular purpose for which they were designed, although the city at large may be the loser.



Examples of "flood" lighting of public buildings. The upper view is the public library in Lynn, Mass., and the lower is the City Hall in Waterbury, Conn. (p. 240).



Examples of the illumination of towers. Woolworth Building, New York, on the left; General Electric Building, Buffalo, on the right (p. 242)

CHAPTER XIII

THE RAILROAD IN ITS RELATION TO THE STREET SYSTEM

THE railroad as a means of transportation and the important part which it plays in the development and growth of a city is generally recognized. Essential as it is to the prosperity of a city, it presents serious physical problems and often great difficulties in the development of a convenient and adequate street system. The railroad considered in this connection is not that which supplies intra-urban transit, whether upon, under or over the city streets, but the lines which connect the city with the rest of the world, which accommodate long-distance travel and which supply the needs of the community and distribute its manufactured products. The different railway lines entering a city cannot be permitted to divide it into sections which are isolated, the one from the other. The streets cannot be abruptly stopped at the railroad tracks, but must be carried across them, even though to do so involves danger or large expense. When towns or districts of an existing town are being rapidly developed into important manufacturing, commercial or distributing centers the railroads are eagerly welcomed, the more of them the better, in the belief that competition will reduce transportation rates. They are not only allowed to locate their terminals wherever they can secure the cheapest property for the purpose, but they are permitted to reach these terminals by such routes as they please without regard to their track location with respect to other tracks which they may cross at grade, if the State laws permit, and the result is often such a condition as has grown up in Chicago (Fig. 5, p. 69), though usually on a much smaller scale. Occasionally the railroads are allowed to occupy the

surface of existing streets, as in Syracuse; but even if on their own rights of way, they are very likely to have been carried across existing streets at grade, although in most states this is no longer permitted. Many of the states have enacted laws requiring new lines to be carried either over or under all streets which are in use, but rarely is any effort made so to locate the tracks, either with respect to lines or grades, as to provide for carrying streets which may be mapped but not yet built over or under the tracks at a minimum of expense and disturbance of the street plan. Railroads built through thinly settled districts which produce little business for them are obliged to keep their original construction cost down to the lowest possible figure and to provide for betterments from their future earnings, and this policy is often followed even with respect to the portions of their lines entering or passing through urban districts. This is all very reasonable from the railroad point of view, but it may be disastrous in its effect upon the city plan. In the densely populated countries of Europe, where the railway lines are relatively short and a larger capital expenditure for initial construction is justified, grade crossings are rarely permitted in either urban or rural districts, but the entire railroad right of way is enclosed, so that access to the tracks is difficult or must be so deliberate as to be in the nature of trespass. There are exceptions to this rule, however, as in the city of Lincoln, England, where the principal street of the town crosses the railroad at grade in the real American fashion. As the city grows and its street traffic increases the dangers and delays incident to grade crossings of the railroads become intolerable and their elimination becomes necessary. The cost of this work is so great that many large cities put up with the inconvenience until the annual loss of life is so great that action can no longer be deferred.

At Pullman, for instance, two trunk-line railways cross a street at grade about half a block from the main entrance to the Pullman works. Between two and three hundred trains a day, including the suburban service, pass over these tracks,

two of them being through trains running at full speed across the street within a few minutes of 5:30 in the afternoon, which is the quitting time for 9,000 employees. It is said that in 22 months 41 fatal accidents occurred on these and other crossings in the vicinity and, when the public realized the extent of the slaughter which was going on, an agitation was begun which led to the adoption of an ordinance requiring the elevation of the tracks before the close of the year 1916.

A branch of the Long Island Railroad within the limits of New York City passes immediately alongside of several industrial plants employing a large number of men and women. The tracks are not fenced in and they cross the streets in the vicinity at grade, and the operatives at these plants have been in the habit of following the railroad right of way as a shortcut to the nearest street which will take them to and from their work. For several years there has been an average of eight fatal accidents a year at this place, or about one every six weeks. Proceedings were commenced to eliminate all grade crossings on this portion of the railroad in such a manner as to prevent access to the railroad right of way, but inasmuch as the raising of the streets would necessitate the construction of a new bridge across an important navigable waterway alongside of the railroad, and as the city had not provided the funds required for this new bridge, and as any substantial change in the railroad grade was impracticable, no steps have yet been taken toward the elimination of the crossings.

The work of grade separation is often delayed until such conditions exist and then either the railroad is compelled by the exercise of the police power of the state to elevate or depress its tracks or the work is undertaken and the cost is divided between the railroad company and the city, while in many cases the state pays a portion of the expense. The laws governing the distribution of the cost of this work vary greatly, and the determination as to how it is to be divided is considered to be a function of the state and not of the municipality. In New York State a newly constructed railroad is

required to carry its tracks either over or under all existing roads or streets at its own expense, nor is it permitted to cross another railroad at grade. In the case of new streets which may be carried across an existing railroad the expense is divided equally between the railroad and the city, town or county. Where an existing grade crossing is to be eliminated one half of the expense is imposed upon the railroad company, one quarter upon the municipality or county and one quarter is assumed by the state in view of the need of the work as essential to public safety, which is of state-wide concern. In all cases the manner of the crossing must be determined by the Public Service Commission, and plans for the work and contracts for its execution must be first submitted to and approved by the Commission, to which body must also be submitted, upon the completion of the work, full information as to all items entering into the cost, which cost is then apportioned by the Commission in accordance with the provisions of the statute.

Some of the states have not enacted laws governing the distribution of the expense of grade crossing elimination. Others have created boards or commissions with power to order the elimination of dangerous crossings and apportion the expense, but in several of these no action has yet been taken, this probably being due to the fact that in these states it is the railroad company that is expected to take the initiative and not the state, city or town. The provisions of some of the state laws will be briefly discussed, most of the information being taken from a synopsis prepared for the Committee on Grade Crossings of the National Association of Railway Commissioners by Mr. James B. Walker, Secretary to the Public Service Commission for the First District of New York.

In Connecticut laws enacted as early as 1876 required each railway company to remove at its own expense one grade crossing each year for every 50 miles of road owned or operated. When, in addition to this, a railway petitions the



Showing the effect of placing trees on the street line instead of along the curb. The upper view shows the introduction of a parkway with planting in a street 80 ft. wide, all buildings being placed 20 ft. back of the building line. In the lower view the lots on the right are exceptionally deep and an irregular parking space has been introduced in the roadway, the buildings being set back 15 ft. (p. 242).



View showing the character of the development at Forest Hills Gardens, New York (See also Fig 59, p. 310 and Pl 86, p 314.) Reproduced from photographs kindly furnished by the Sage Foundation Homes Co (pp. 244 and 312).

State Railroad Commission for the abolition of a grade crossing the company pays the entire expense. If the petition is made by the town or city the State Railway Commission may order the railway company to pay 75 per cent of the expense and the town or city the other 25 per cent if the highway existed when the railway was built, but if subsequently laid out and constructed the cost is divided equally. If the Railroad Commissioners order a change without petition the railways pay 75 per cent of the cost and the state the other 25 per cent.

Illinois gives its Public Utilities Commission broad powers to apportion the expense of abolishing existing grade crossings between the railroad company, the state, the county or the town.

In Indiana the Public Service Commission may order railroads to abolish grade crossings, the cost of the work to be paid, three quarters by the company and one quarter by the county. Only one order for a grade separation can be made in one year in each county.

In Iowa, cities of over 7000 population may require any railway to build one viaduct across any public street in any one year, the entire cost of the work to be borne by the railroad company, but the city is to pay all damages which may result from the separation of grades.

In Maine the State Railroad Commission, upon the petition of the local authorities, may order railroad and street grades to be separated, and the cost is borne, 25 per cent by the state, 10 per cent by the town and 65 per cent by the railroad company, with the provision that the state's share of all such work must be limited to \$15,000 in any one year.

Massachusetts has a general grade crossing law, under which each case is considered by a special commission appointed by the Supreme Court. Sixty-five per cent of the cost is paid by the railroad, not more than 15 per cent by a street surface railroad, and the remainder is divided between the state and municipality, the share of the latter being limited to ten per cent.

In Michigan a considerable amount of grade crossing elimination has been carried out. None of the cost appears to have been paid by the state, but machinery is provided whereby cities may join with the railways in the improvements.

In Minnesota the matter is left to the cities themselves, and naturally the distribution of the cost varies in different communities. The railway usually builds the necessary bridge structures and sometimes the approaches also, while in some cases the railroad company has also paid for damages to property.

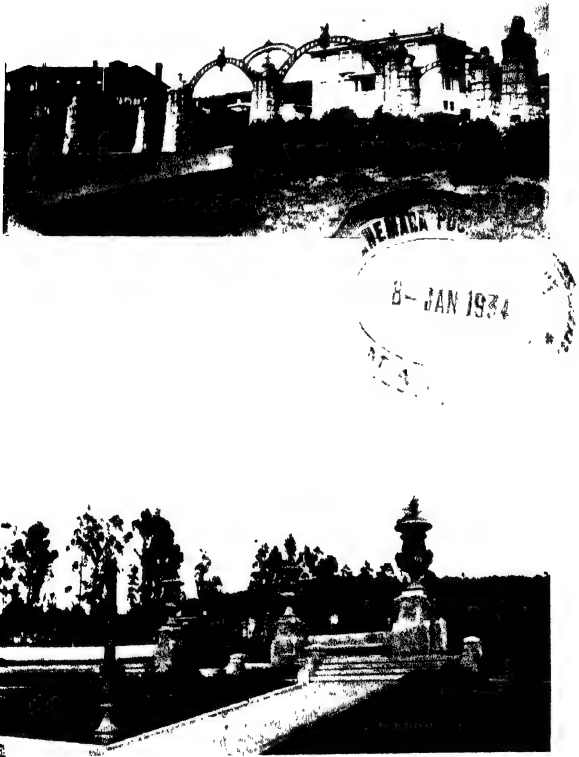
In New Hampshire, if the Public Service Commission refuses to consent to new grade crossings, at least one half of the expense of constructing over or under crossings is paid by the railroad company, although a greater proportion of the cost may be imposed upon the company if the Commission so determines. Existing crossings may be ordered abolished at the sole expense of the railroad company.

In New Jersey the Commission may order grade crossings to be abolished at the sole expense of the railroad company, except that if a street or road is occupied by surface railway tracks the company owning such tracks shall contribute ten per cent of the cost.

In Ohio the law empowers the municipalities to require the raising or lowering of tracks, and forbids the creation of future grade crossings, except by permission of the court. Under an earlier law 65 per cent of the cost was paid by the railroad company and 35 per cent by the city or county, with a provision that one half of the city's share might be assessed against any street railway company using the street which was carried over or under the railroad.

In Pennsylvania the Public Service Commission is given entire control over grade crossing elimination, and the railroad companies are required to pay such proportion of the expense of the work as the Commission may determine.

In Rhode Island there have been special acts covering specific crossings. The Commission may order grades sepa-



Entrances to a suburban development on the outskirts of San Francisco.
(See Fig. 60, p. 314 and p. 244.)

PLATE 69



Entrances to the St. Louis "places." Upper, Westmoreland plan, lower, Lenox plan. These and the views on Pl. 70 are reproduced from photographs kindly furnished by Mr. John Noyes, St. Louis (p. 244).

rated if it seems necessary, and the expense is apportioned by the court. In Providence the railroad companies pay two-thirds of the cost and the city one-third.

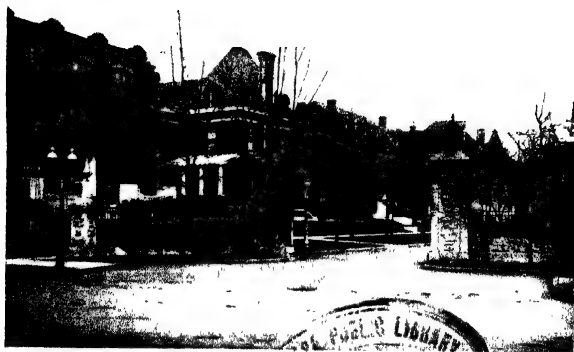
Vermont has a law somewhat similar to that of Connecticut, requiring each railway company to eliminate one grade crossing each year for every 80 miles of line. In the case of additional crossings the town pays not more than ten per cent, the state not more than 25 per cent, and the railroad company the balance, as apportioned by the Commission.

The above does not include all states which have passed laws dealing with this subject, but the cases given are typical. The most comprehensive grade crossing elimination work has been undertaken by cities under special statutes. Buffalo has done a great deal of work through a special commission and, while the distribution of cost has varied somewhat, the general policy laid down by the commission is that all expenses for right of way shall be paid by the railroad company, that the cost of other land needed for the structures and the cost of the bridges shall be paid, two-thirds by the railroad and one-third by the city, while the damages are shared equally. In Chicago many millions have been expended by the railroad companies in the elevation of their tracks, the city's contribution being less than one per cent of the total cost, this representing consequential damages. In Detroit the railroad companies pay for all of the physical work and the city the damages, which amount to 25 per cent or more of the total expense. In Philadelphia the practice has varied from time to time, the railway formerly paying the cost of construction and the city assuming the damages, while under special agreements the expense has in some cases been shared equally, in others the railroad company has paid one-third, and in still others two-thirds of the cost, and the city the balance.

The work of grade crossing elimination involves such great expense that it can seldom be carried out in a wholesale fashion, but must be undertaken progressively. It is a mis-

take, however, to consider each crossing or even a group of crossings in close proximity to each other as a separate problem. As in all other city planning, a comprehensive scheme should be worked out in advance, even though it may be years before it is entirely completed. In studying one small section of a railroad line it may be quite evident that the most economical treatment and that which will involve the least disturbance of existing conditions will be to elevate the railroad and depress the streets enough to carry them beneath it. On another part of the line, where the conditions have become so bad that the grade crossings must be abolished, the easiest and cheapest plan will be to lower the railroad grade and carry the streets over it. When the intervening section is to be treated it may be found that to pass from a railroad on embankment to a railroad in cut will render it very difficult and expensive, or even impossible, to carry some important intervening streets across the tracks in any way. Had the entire length of the railroad in its relation to the street grades been studied in advance, the treatment of one of the limited sections might have been so modified as to give the best results along the entire line. Before the plans for any of the crossings are determined a decision should be reached as to the manner of treating every other crossing of the entire line of every railroad entering the city. The work may be carried out step by step, but each step should be in accordance with a consistent and comprehensive plan.

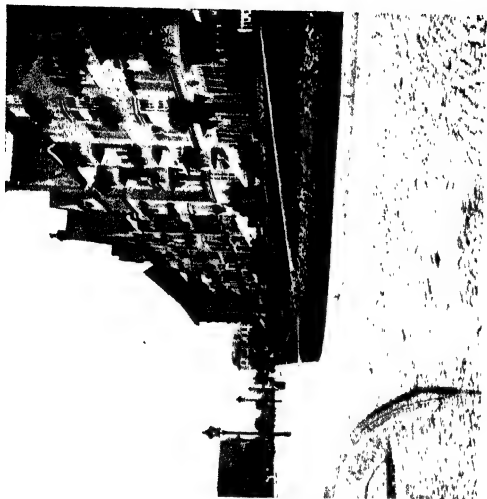
The clearance which it is possible to secure will vary considerably. Railroad companies desire and actually require a minimum of 16 ft., and for freight lines, more particularly at the entrance to yards, they prefer about 22 ft. in order that trainmen may stand on the tops of freight cars without danger. Such a clearance can seldom be secured in populous districts, and in some places standing on the tops of cars is forbidden by law or by the regulations of Public Service Commissions. Where streets pass under the railroad a clearance of 16 ft. is desirable, but it is frequently reduced to 14 ft., and in some



Entrance to Hortense place, St Louis, and view showing the set-back restrictions and double rows of trees between curb and sidewalk (p. 244).



Arcade along the rue de Rivoli, Paris.



Front yards in Berlin.

Both views from photographs by Mr. Geo. W. Tillson

special cases to 12 ft.; but this should be avoided wherever possible. In New York the general practice is to require all railroad bridges 75 ft. or less in length between abutments to span the streets without intermediate supports; but where the length is greater intermediate columns on the sidewalk just back of the curb are permitted and, in exceptional cases, where the street is unusually wide or the skew is so great as to require a long span, columns are permitted in the middle of the roadway.

Having settled upon the nature of the crossings and the clearance required in each case, the next thing to be determined is how much each grade line is to give way to the other; that is, whether, in the case of an under-crossing, the street shall be lowered to such an extent as to reduce to a minimum the height of the railroad embankment or whether the railroad shall be so raised as to avoid the need of any great departure from street grades or, in the case of an over-crossing, whether the street shall be carried over the railroad with little change in the latter, whether the railroad shall be depressed sufficiently to permit the street to pass over it with little disturbance of its natural grade, or whether the one shall be lowered and the other raised about equally. The solution of these questions will frequently be governed by the need of providing for the drainage and sewerage of the territory, a substantial depression of either street or railroad being likely to interfere seriously with adequate provision for drainage. Owners of property in the vicinity naturally prefer to have the railroad placed out of sight, and its complete depression is generally urged. Such treatment is more expensive, especially if it involves the lowering of tracks which are in use, and it seriously interferes with the provision of industrial spurs and sidings. If the railroad is slightly lowered, the street grades must be substantially changed in order to carry them over, and this involves either steep grades or long ramps, resulting in damages to abutting property which will be left below grade, the raising of a street above the natural surface always resulting in much greater

damage than does its depression below the surface. If the railroad is to be raised every additional foot of elevation is opposed on account of the barrier which a high embankment will place between the districts on the two sides of the tracks. There is, however, a great advantage in permitting the streets to remain as close as possible to their natural grade rather than to permit the introduction of depressions which it will be difficult to drain and which will obstruct the view of vehicles approaching from the opposite direction. Considerations of cost will be likely to control the decision, the state, the city, and the railroad company all sharing the expense in most instances. The preservation of the traffic value of the street and the avoidance of interference with the drainage system should in all cases be given careful consideration.

These details being settled, the next question is the character of the structures to be erected. Where the bridge carries the highway over the tracks little besides its roadway, sidewalks and protecting railing will be seen, and the chief consideration will be its adequate capacity and its safety; but where the railroad passes over the street its appearance is of the greatest importance. The railroad is a utility upon which the growth and prosperity of the town depend and its practical purpose can be frankly recognized and expressed in the structure which will carry it across the public highway. To try and make a railroad bridge look like a triumphal arch is absurd. On the other hand, the erection of a few steel columns and girders with wooden cross-ties separated by open spaces—in other words, a structure which will simply get the tracks across the street and permit traffic to pass under them—should not be tolerated. This is quite generally recognized now, and an effort is usually made to erect bridges which will be attractive in appearance, an object which can more easily be attained than was formerly possible and within reasonable limits of cost, owing to the recent advances in the art of reinforced concrete construction. Excellent examples of such bridges are to be found in nearly all cities, several illustrations

being given. One of the notably successful structures of this kind is shown (Pl. 75, p. 261), where the treatment of the adjoining station platforms has been especially successful and adds greatly to the pleasing effect of the bridge. This was built in connection with an extensive scheme of grade crossing elimination which included another simple but attractive bridge (Pl. 76, p. 268). An example of a simple bridge constructed in a suburban district to do away with a dangerous crossing between two curves in the road is illustrated by the views on Pl. 77 (p. 269). Philadelphia has done a great deal of grade crossing elimination, in connection with which the treatment of the concrete surfaces of the bridges, piers and abutments to give them a good appearance has been especially successful, an example of the work in that city being given (Pl. 74, p. 260).

A difficult and interesting problem was presented in the case of three bridges over Queens Boulevard, in New York, all being within a distance of 2700 ft. The relative position of these crossings and the angles at which the railroad lines cross the street are shown by the accompanying diagram (Fig. 54, p. 258). It was necessary that the two outside bridges, one carrying six tracks and the other two, should be placed at as low an elevation as possible and leave sufficient clearance for the street, while the intermediate bridge, carrying a railroad that crosses over the other two, had to be much higher. The railroad companies were advised to secure the services of an architect who should collaborate with their engineers in working out the plans of these three bridges in such a manner that they would bear a proper relation to each other, and Mr. Arnold W. Brunner, of New York, was retained for this purpose. The manner in which the problem has been solved is indicated by the illustrations (Pl. 78, p. 270). The six-track bridge has been constructed and is in use, but, as the street which it crosses has not been improved for its full width, the architect's sketches have been used for the illustrations instead of a photograph of the structure actually built. As the boulevard crossed by these bridges is to be divided

into three roadways, separated by parking strips 30 ft. in width, these latter spaces, in the case of the low-level bridges, are used for substantial piers, which are actually buildings to be devoted to the storage of supplies and tools used by the forces employed in street cleaning and repair work, thus reducing the bridge spans and avoiding placing

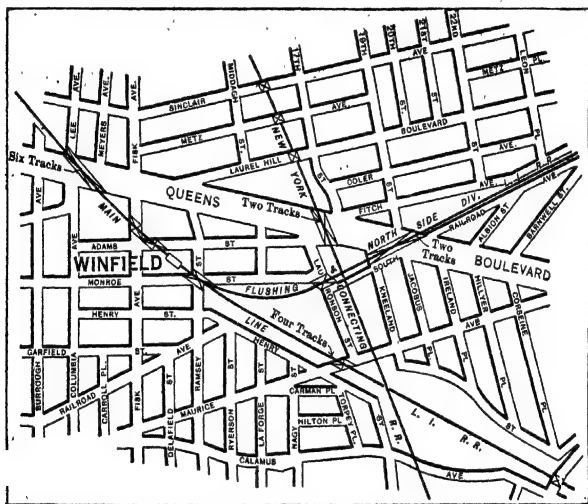


FIG. 54.—Plan showing the location of three railroad bridges across a boulevard 200 ft. wide within a distance of about half a mile and all at different angles (p. 257).

too much emphasis upon the somewhat scant clearance over the surface of the roadways. In the case of the higher bridge arches are to be used, the piers being placed in the parking spaces. All of these designs recognize the practical purpose of the bridges and do not attempt to make them appear other than what they are—the means of carrying railroads across a highway; but this has been done with as little disfigurement of the boulevard as possible.

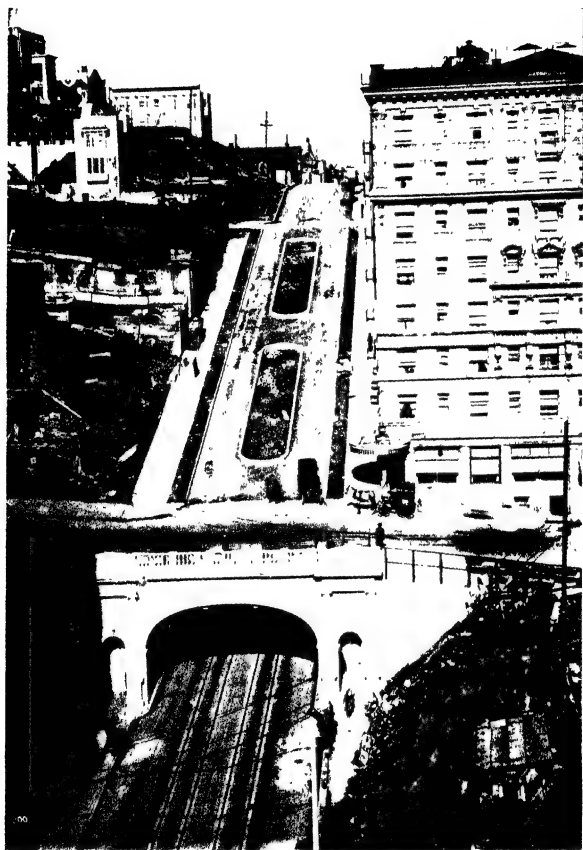


A street in Redlands, Cal , lined with pepper trees which in the fall are filled with clusters of brilliant red berries



Roses in a street in Portland, Ore , showing the profusion of flowers to be found in many of the cities of the Pacific coast.

PLATE 73



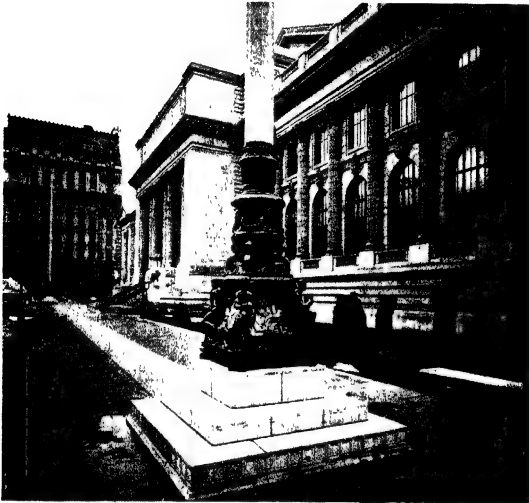
The Stockton Street Tunnel, San Francisco, showing the manner in which some of the excessive grades are overcome. These grades resulted from the adoption of a rectangular plan without regard to topography. Reproduced from photograph kindly furnished by Mr. M. M. O'Shaughnessey, City Engineer.

Many other examples might be given of the way in which this problem of carrying highways over or under railroads has been solved, but the purpose of this brief chapter is simply to emphasize its importance as a part of the general city plan and to urge that it be approached as a thoroughly practical one. To disguise the railroad bridge in an effort to make it look like something other than the useful and necessary thing it really is will render it ridiculous, which is as undesirable as the unmitigated ugliness which has often characterized such structures where no intelligent control has been exercised by the public authorities and the railroad companies have appeared not to care how they look.

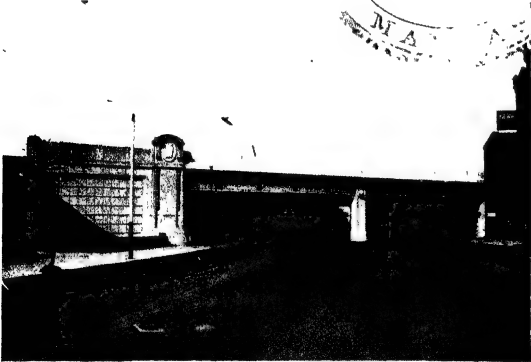
CHAPTER XIV

RESTRICTIONS

THIS chapter will be devoted to a consideration of the various measures which are designed to insure to the citizens at large the full enjoyment of all the advantages which a well-organized city should supply and to prevent such acts of the individual or such use of private property as will in any way militate against such enjoyment. Among these advantages, besides the free and safe use of the public streets, the right to which is universally admitted, there may be included freedom from obstruction of light and air by a neighboring owner; prevention of the appropriation of public property to private use; a guarantee of the preservation of the character of a district when once established by protecting it against invasion by industries, uses and occupations inconsistent with that character; the conservation of the value of private property by an orderly scheme of development and improvement; the prohibition of the erection of structures, either permanent or temporary, which will offend the eye; the provision of facilities for sane and wholesome amusement and recreation; the prevention of offensive odors or harsh and unnecessary noises, or of anything destructive of what the English so well and so frequently express by the word "amenity." In European cities these rights of the public are now taken for granted, and the rights of the individual citizen and property owner must be subordinated to them. As already stated in these pages, the citizen is simply a small unit in what goes to make up a city, and whatever he does must be considered in its relation to and its effect upon the body of citizens whose interests, comfort and convenience are paramount.

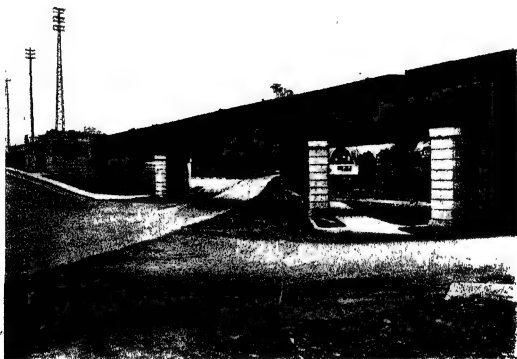


The bronze base of one of the flag staffs in front of the New York Public Library. Reproduced from photograph kindly furnished by Mr. Thomas Hastings of Carrère & Hastings, architects of the building.



One of the more ornamental bridges recently erected in Philadelphia in connection with grade-crossing eliminations. From a photograph kindly furnished by Mr. Geo. S. Webster, Chief of the Bureau of Surveys (p. 257).

PLATE 75



A grade-crossing elimination where the railroad was raised and the street lowered. The treatment of the station and its approaches is very satisfactory. This and the views on Pls. 76 and 77 are from photographs furnished by the New York Public Service Commission (p. 257).

American, and to a great extent British, cities have been slow in asserting themselves and do not appear to realize their rights as against the citizen. There is a traditional feeling among the English-speaking people, due, perhaps, to many of the provisions of the English common law, that there is a certain sanctity and inviolability inherent in private property, and that its owner must be carefully protected against any act which may in the slightest degree curtail the fullest enjoyment of it or any profit which may be derived from its use, provided such use may be within the letter of the law, even though prejudicial to the comfort, convenience and enjoyment of others. The idea underlying this feeling is that the individual unit going to make up the city must be carefully protected against the tyranny of the city as a whole. If the individual is rich and powerful, he may take advantage of this protection for his own aggrandizement and to the serious detriment of those who are less fortunate. But it is better—so those who are passionately devoted to the sanctity of the rights of private property believe—that an injustice should be done to the general public than that the vested rights of real property should be violated. Just how private real property acquired these rights does not appear—whether through an omnipotent power which orders human affairs or whether by successive steps of aggression on the part of the land owning class. The right to use individual property in whatever manner seems best to the owner has become a well-established principle; to overturn it or even to question it would, in their opinion, be subversive of public order and well-established legal procedure.

The word restrictions as applied to the regulations governing the use of private property is likely to be understood in the United States and Great Britain, although in Continental Europe it is so generally recognized that the individual has no right to use his property without regard to the interest of his neighbor or of the general public that the prohibition of such use would scarcely be regarded as a restriction. It implies public control of the use of such property in the interest of the

public at large, although the right of the public to such control and for its benefit and protection may not yet be generally conceded. In many American cities there has been a disposition to make use of portions of the public streets for private purposes. The exposure of goods for sale on the sidewalks in front of shops, the loading and unloading of bulky packages and barrels by means of skids extending across the sidewalks, with complete interruption of their intended use, the erection of permanent platforms on parts of the sidewalks in front of shops and warehouses handling heavy materials, the erection of storm-doors, porches, steps to floors both above and below the street level, and even the storage of trucks and machinery in the streets at night, are not uncommon sights in many of our cities, whether the city's title to these streets is simply a public easement for street purposes or whether it is a fee absolute held in trust for the use and benefit of the whole city.

In the city of New York the practice of encroaching upon the streets by steps, porches, show windows, entrances, and even by supporting columns forming an integral part of building structures, had become so common that the abutting owners came to consider them entirely lawful, and efforts to remove them were resisted as an invasion of their fully established rights, even though this city owns its streets in fee for their full width. It was not until 1910 that the first serious attempt was made to correct this abuse. The first street selected for the enforcement of the right of the public to the free use of the entire width of the street was Fifth avenue. This avenue had been laid out and acquired at a width of 100 ft. The roadway was 40 ft. in width, with sidewalks 30 ft. wide on each side, but half of the sidewalk space had for many years been converted to private use. Many costly buildings had been erected along the avenue whose entrances, steps, bay windows, and in many cases supporting columns and pilasters extended beyond the street lines. Fences had been erected enclosing one-half of the sidewalk, and in some cases sunken gardens and ornamental planting occupied the spaces

inside of these fences or low walls. So long as the street remained devoted to high-class residences, these encroachments excited little comment or criticism; but when the stately old homes gave way to business buildings and the vehicular traffic greatly increased, the roadway of 40 ft. became inadequate, and it was decided that it should be increased to 55 ft. and that all of the building encroachments should be removed, although, in view of the large number of costly and handsome buildings which were in part supported by construction projecting beyond the street lines, it was agreed that all owners who should before a fixed date remodel their buildings might retain such supporting columns or steps as would not encroach more than $2\frac{1}{2}$ ft., leaving in such cases unobstructed sidewalks of 20 ft., or five ft. more than formerly existed. The entire expense of the changes was to be borne by the abutting owners, but the city was to bear the cost of the widening of the roadway. In view of the claims which had been made as to the right of abutting owners through long-established custom to use the streets for purposes of ingress and egress and for the ordinary appurtenances of a building other than the parts used for residence or gainful occupation, much opposition was anticipated. There was considerable opposition, with threats of legal procedure, but the majority of the owners appeared to appreciate that the removal of the obstructions would make a better street and that their property would be more valuable without them. The work was carried out, and these expectations were so fully realized that the same treatment was extended northwardly to the entrance to Central Park at Fifty-ninth street.

In the second or upper section there were still more costly buildings affected, but the opposition was much less, and when the work had been completed it was difficult to find any owner of property within the limits of the two sections who would have been willing to go back to the old conditions, although the aggregate cost of the changes which they had been compelled to make was probably about \$2,000,000. Since then the same policy has been adopted with respect to important

business streets, not only the wider thoroughfares, such as portions of Broadway, Sixth avenue, Fourteenth street, Twenty-third street and Forty-second street, but to the narrower downtown streets, such as Nassau, Wall, Pine and Cedar streets, and the approaches to the ferries, such as Cortlandt, Barclay, and Chambers streets (Pl. 79, p. 271). In streets of the latter class there were numerous cases where platforms had been erected in front of wholesale provision houses, where large quantities of fruits and vegetables and other heavy materials were loaded and unloaded from trucks, and it was stated that the removal of these platforms would cause a great hardship and would necessitate an entire change in the conduct of business of this kind. The ordinances were adopted, however, and the obstructions were removed, and there was such a change of feeling on this question that in several instances the municipal authorities were requested to extend the limits covered by the ordinances, the petitioners apparently having been convinced that business would be improved and not injured by the removal even of their own encroachments and the opening up of the streets to the public use for which they were designed. So generally has this view been accepted that the title insurance companies and financial institutions which loan money for building operations, and who were formerly inclined to be insistent upon the right of the abutting owners to occupy a portion of the sidewalk in front of their property, now refuse to insure titles or loan money on buildings having such encroachments.

Obstructions to the free use of the streets are not confined to American and British cities. They are also to be found in those of Continental Europe, sometimes maintained by private owners and not infrequently by the city itself, although investigation would probably show that some of these have existed for generations and have not been erected in violation of public rights which may have been acquired and paid for by the public (Pl. 80, p. 294).

The right of the city to control and prevent the private

occupation of its public streets is so obvious that it can scarcely be questioned. But the modern idea of the obligation of the city to its citizens, as indicated in the opening paragraph of this chapter, is much more comprehensive and extends to the use which may be made of the property outside the street lines and which is actually owned by individuals. In the United States such control is still quite likely to be considered an arbitrary restriction of the rights of owners in the use and development of their property.

The most common regulations of this kind are those affecting the height and arrangement of buildings. They may have two separate and distinct purposes—either to improve sanitary conditions by insuring adequate light and air and avoid damage in case of fire or accident, or to add to the dignity and attractiveness of the streets by avoiding a too ragged skyline and preventing the erection of buildings of excessive height which may deprive the owners of adjacent property of their due share of light and air and render impossible the reasonable and proper use of their land. While the propriety and reasonableness of restrictions to insure better sanitation and protection from injury are now quite generally recognized, and such restrictions are believed to be a legitimate exercise of the police power, those which have for their object the mere improvement of the appearance of the street or which are based upon æsthetic considerations are very likely to be contested in the English-speaking countries. On the Continent of Europe regulations of the latter class are accepted as a matter of course, with the firm conviction that anything which affects the general appearance of the public streets is the concern of the entire community, whose interest is paramount to that of any individual, while in some other countries regulations having for their purpose the improvement of the appearance of the streets are still likely to be regarded as unduly restricting the inherent right of the individual to the free use of his property, and therefore as an improper use of the police power. Even in these countries there is a growing feeling

that private rights have been unduly considered and must give way to the public interest—that is, to the interest of all the people. In large cities the social organization is so complex and the life of the individual touches thousands of others at so many points that the same freedom of action cannot be permitted which is unquestioned in a rural community.

The regulations most obviously necessary are those governing the proportion of plots which may be built upon and the arrangement of the buildings and open spaces, as these are essential to good sanitation and decent living. While ordinances of this kind vary so greatly that those of a great number of cities cannot be compared and classified, those of a few typical towns will be briefly stated. The greatest number of cities for which such regulations have been adopted are in Germany, and they are there found to be more complex and varied than in any other country. They are applied in connection with the zoning system so generally adopted by German cities and which was first advocated by Baumeister in the seventies, but was not actually put in force anywhere until 1884 in Altona, when the famous Dr Franz Adickes was Mayor of that city. In 1891 Adickes, who had become the chief executive of Frankfort-on-the-Main, introduced it there, and it was soon taken up by the German and Scandinavian cities.¹ The older or inner city is naturally the first zone where the highest buildings are allowed. Building in solid blocks is also permitted, and this district is commonly built up to a fairly uniform height. Outside of this inner city there are other zones in which the allowable height of buildings progressively diminishes, although there may be residential, factory, and mixed districts. Manufacturing districts are so located as to afford convenient transportation and so that the prevailing winds will blow the smoke away from the residential

¹ See report of Mr. F. B. Williams on "The German Zone Building Regulations," made to the Heights of Buildings Commission of New York City and printed as an appendix to the report of that Commission in 1913.

districts. In some cases residences are entirely prohibited in the factory districts.

In some German cities the effort to adapt buildings to special conditions has resulted in a great number of small districts, some of which may relate to a single street or to several city blocks. The permissible height and the area of land which may be covered is naturally greatest in the central district and is much less in side streets and in the suburbs. In Munich and Karlsruhe classes of streets are established with different regulations for each street, the latter city having created 16 classes of streets by ordinances adopted in 1912. In Germany, as in America, private developers of real estate have not infrequently imposed restrictions more severe than those prescribed by the city in order to give a distinctive character to the district. While such restrictions are frequently adopted in the interest of better fire protection and health, they more and more tend to promote sightliness, such as the provision that side walls visible from the street must be finished to the same degree as the front, and painting in garish colors is forbidden. In some German cities no permit will be issued for the erection of a building on any street which is classed as unfinished unless the plans for such building shall first have been approved by some public officer. This power is frequently exercised in an autocratic fashion. A piece of curbing may be deliberately left out on a certain block and the street is consequently called unfinished. If the design of a building which a citizen desires to erect does not meet with the approval of the officer who must issue the permit, he can say that the street is unfinished and that the permit cannot be given. If, however, the design is so modified as to meet his approval, the permit is issued.

In Berlin the proportion of any lot which may be built upon depends upon the area of the lot and its location. For all lots up to 32 meters in depth the regulations are similar for all portions of the city both within and without the former walls, while for lots more than 32 meters in depth there is a

difference in the regulation for the areas within and without the old walls. For the purpose of computing the portion of the lot which may be built upon, the lot is divided into strips, or zones, the first of which extends from the building line to a depth of six meters, the second from the six-meter line to a depth of 32 meters from the building line. On the first strip the entire area may be covered. On the second strip seven-tenths of the area may be covered, while if the lot is deeper than 32 meters, six-tenths of the area back of the 32-meter line may be built upon if it lies inside the former city walls and five-tenths may be occupied by a building if without the old walls. In computing the area which may be occupied, the areas upon which building is permitted on the different strips or zones above described are added together and the resulting total area may be occupied by buildings, without regard to the proportion of the area occupied on any one of the strips.

In Frankfort-on-the-Main, the proportion of the lot which must be left free depends upon the district in which it is located. In the central district one-fourth of interior and one-sixth of corner lots must be left open; in the factory zone, three-tenths; in the dwelling and mixed districts of the inner zone, four-tenths of interior and three-tenths of corner lots; in the same districts of the outer or suburban zones, one-half of interior and four-tenths of corner lots, and in the country district, seven-tenths of all lot areas.

In Munich all new buildings erected in the portions of the city which are built up in solid blocks must have at least one-third of the area of the lot left free, not counting light shafts and front gardens. An unusual provision of the Munich building regulations, which was apparently designed to prevent the unnecessary impairment of values, applies to buildings in use at the time of the adoption of these regulations in 1879, and which were erected in compliance with the authorized practice at that time and which remain suitable for habitation, and where the street or neighborhood has undergone no radical



A grade crossing elimination in New York by carrying the railroad over the street on a simple but attractive bridge (p. 257)

PLATE 77



Showing the elimination of a blind grade crossing on Staten Island, N. Y., by changing the position of the highway and slightly raising the grade of the railroad (p. 257)

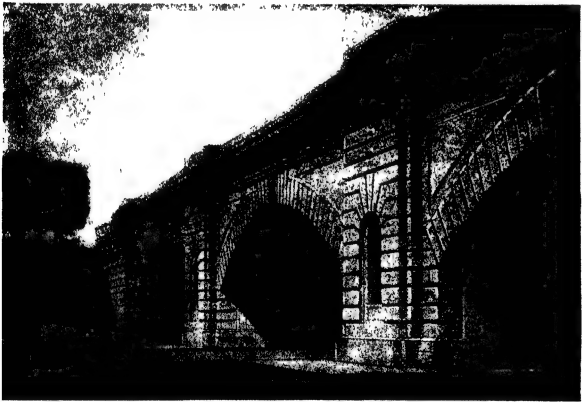
change. Where such buildings cover less than three-fourths of the lot area they may be extended or added to until they cover three-fourths of the lot, and where such buildings already cover more than three-fourths of the lot they may be extended or added to until only one-fifth of the lot area remains free, not counting in either case light shafts and front gardens in such uncovered area, and provided, further, that in such additions the best standards as to construction, fire protection and sanitation are followed. In the case of detached buildings the area remaining unbuilt upon back of the building line must be one-third of the lot area in Classes 1, 2 and 3, and one-half in Class 4, for interior lots, while for corner lots in all classes one-fifth, or in exceptional cases, which are described in detail, one-sixth of the lot area must remain free. The classes of buildings referred to are those fixed by permissible heights. In all cases the maximum depth of buildings shall be 22 meters. In groups of buildings treated as a single architectural unit, the length may not exceed 45 meters for Classes 1 and 2, or 36 meters for Classes 3 and 4, while the minimum distance between the groups shall be seven meters for Class 1, nine meters for Class 2 and ten meters for Classes 3 and 4.

Hamburg has no specific regulations governing the proportion of the lots which may be built upon, but the size of the open space is determined by the permissible heights of the bordering walls of living, sleeping and working rooms.

In Düsseldorf there are five zones for which the heights of buildings are fixed, but in each zone there are from two to five classes, for each of which the proportion of the lot which may be built upon is prescribed. In Zone I there are three classes: *A*, in which two-thirds of the lot may be covered; *B*, in which one-half may be used if there are rear buildings; *C*, in which three-fourths of the area may be covered provided the buildings are not more than ten meters, or two stories in height. In Zone II there are also three classes: *A*, where one-half the lot may be used for buildings; *B*, where four-tenths may be so used if there are rear buildings. *C*, where

six-tenths of the lot may be covered with one, two, three or four-family houses or houses accommodating more than four families, but with not more than two apartments on each floor, or with apartment houses having not more than three apartments on each floor, provided the buildings are not more than 20 meters in depth. Zone III has two classes: *A*, in which four-tenths of the lot area may be covered; *B*, where one-half may be built upon under the same conditions prescribed for Class *C* in Zone II. In Zone IV there are five classes, of which *A*, *B* and *C* apply to specific streets and parts of streets and which, respectively, restrict the area which may be built upon to three-fourths of the lot for buildings not over eight meters high, two-thirds for buildings from eight to twelve meters high, and six-tenths for buildings over twelve meters high; *D* relates to all other lots in the zone and limits the area to be covered to four-tenths of the lot, except that the fifth class, *E*, allows one-half of the lot area to be covered under the same conditions as are prescribed for Class *C* in Zone II. Zone V includes three classes: *A*, in which three-tenths of the lot may be covered; *B*, in which four-tenths may be covered by front buildings only having a depth not exceeding 16 meters, or by one or two-family houses or apartment houses having not more than two apartments on each floor and a depth of not more than 20 meters; *C*, in which small houses may cover one-half of the lot area.

In Cologne, buildings are divided into six classes, covering houses in blocks and detached houses with or without basements and gardens, while the interior angles of corners are a factor in determining the usable area. Classes 1, 2 and 3 relate to non-detached buildings. In the first class, containing four subdivisions, 25 per cent to 60 per cent of the interior lots must be left open. In the second class, having two subdivisions, from 50 per cent to 60 per cent of interior lots must be left open. In these two classes front yards or gardens up to a depth of six meters are not figured in computing the open spaces. In Class 3 interior lots containing basement



Railroad bridges across Queens Boulevard, New York, 200 ft in width; the upper carrying six and the lower two tracks. Reproduced by courtesy of Mr. Arnold W. Brunner, architect of both structures (The Fig. 54 and p. 257.)



The upper view illustrates the appropriation of part of the sidewalk on Broadway, New York. In the lower view these steps have been removed and placed inside the building. Reproduced from photographs by Mr Albert Dreyfous (p. 264).

houses must have 70 per cent of their area left open, while only 60 per cent of open space is required if there are no basements, and in any case front gardens to a depth of five meters do not count as open space. The fourth class includes detached houses, and 60 per cent of interior lots cannot be built upon. Spaces between buildings depend upon their height, depth and length, but must not be less than six meters between buildings with basements and five meters in case there are no basements, while front gardens or yards to a depth of five meters and the required distance between buildings are not counted as open spaces. The fifth class covers group buildings and contains three subdivisions: for interior plots 50 per cent to 60 per cent is required to be left free; double houses may have a length not exceeding 30 meters; groups of four may have a combined length of 50 meters, and groups of seven may reach 70 meters in length, while the distances between the groups must not be less than specified for the fourth class. The sixth is a special class relating to buildings of a limited height and without basements, and the requirements are generally similar to the preceding; but double houses may have a maximum combined length of 45 meters.

In Leipzig, the proportion of the lot which must be left free of buildings is indirectly fixed by the regulation that the rear wall of a building may not be higher than the width of a courtyard. If such a regulation were applied to the typical American building lot with a depth of 100 ft., a building 50 ft. or 4 stories high could occupy only half of the lot area even if carried out to the street line, while a six-story building could occupy but one-fourth of the lot. The city of Leipzig issues from time to time pamphlets which indicate the tendencies of city planning and the changing point of view. From statements made in these pamphlets it appears that there is a tendency to decrease the cost of street construction and maintenance on those streets which apparently will be confined to residences by allowing a width of only eleven meters, and in order to compensate for this decreased width, setbacks are

required, the area in front of the buildings being treated as gardens. The opinion is expressed that more provision should be made in the development of the city plans for artistic view-points, for closed street pictures, for a greater variety in the types of buildings and censorship of the plans for the façades

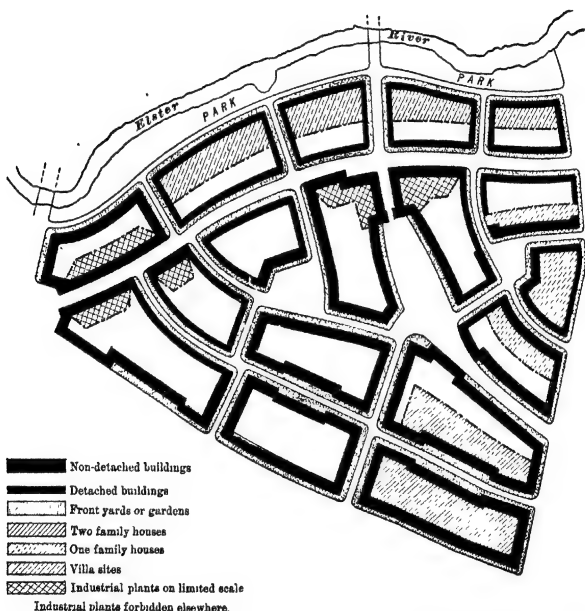


FIG. 55.—Showing typical regulations governing character and use of buildings which are imposed upon specific areas in Leipzig.

of buildings on prominent streets, and for the preservation of natural beauties and village characteristics in outlying districts. It is further noted that in fixing upon a plan suitable for the entire city, local conditions and considerations should be made subservient to the consistent development of the entire city and also of the neighboring districts which are intimately connected with it. The specific regulations im-

posed upon certain well-defined areas in Leipzig are indicated by Fig. 55.

While the regulations in force in other German cities might be given, each differing from the others, the foregoing will indicate the great variety of those designed to prevent a too intensive use of the land and an irregular or ragged appearance of the streets. Each city appears to have worked out its solution of this problem in a different way: which has given the most satisfactory results the author will not attempt to say. All are worthy of careful study, and the fact that they are respected and followed without question indicates acceptance of the principle already frequently enunciated in these pages, that the citizen must in the public interest submit to these limitations upon the free use of his property.

In Great Britain the regulations governing the proportion of the lot which must be left free are much less precise and there is a greater similarity between those in force in different cities. The provisions of only two typical cities will be given.

In Birmingham the building by-laws provide that all new dwellings shall be so erected as to leave in the rear an open space having a total area of not less than 300 sq. ft., which shall be free from any structure above the ground level except water-closets, earth-closets or ash-pits. In the case of the re-erection of a dwelling the total area of the open space shall be not less than 150 sq. ft. Except as hereinafter provided such open spaces shall extend across the entire width of the dwelling and shall be not less than 15 ft. in depth from every part of the building to the rear boundary of the premises. If the height of the building is 15 ft. or more, but less than 25 ft., the depth of this open space shall be at least 25 ft.; if its height is 25 ft. or more, the open space shall be at least 30 ft., provided that where a scullery not exceeding 10 ft. 6 ins. in height is erected at the back of a dwelling, the depth of the open space may be reduced to not less than ten ft., if there is no diminution of the minimum area of 300 sq. ft.

In Sheffield open spaces must be left in the rear of all dwelling houses, which open spaces shall have a total area of not less than 150 sq. ft. for buildings 15 ft. in height, 200 sq. ft. for a height of 25 ft., 250 sq. ft. for a height of 35 ft., and 300 sq. ft. if the height is more than 35 ft., the height in all cases being measured to a point half way up the main roof.

A method of indirectly regulating the proportion of plots which may be built upon is applied through the operation of the general town planning law or has been voluntarily adopted in many of the so-called garden city developments which have become so popular of late and which are treated in Chapter XVI. This is by limiting the number of houses to the acre, such limitations, however, applying to subdivisions some acres in extent and covering an average number per acre, so that in one part of the subdivision the free space about buildings may be much less than in other parts.

In the United States some cities have much more drastic regulations than others concerning the portion of the lots which may be built upon, but in no case have they been worked out in as great detail as in Germany. In a few cases there has been an attempt to establish zones, but they relate to the heights of buildings, rather than to their arrangement and use. The laws and ordinances governing the open spaces are found in the city building codes, the health regulations, the factory and labor laws and the city ordinances. They vary greatly, as do those of the German cities, but do not appear to have the common underlying principles which are apparent in those of that country. A few instances will be given:

In New York dwelling houses accommodating not more than two families may cover 90 per cent of the lot. Hotels may occupy 90 per cent of interior and 95 per cent of corner lots above the second floor, but for each and every story over five an additional two and a half per cent of the lot area must be left free, so that at the fifteenth floor 35 per cent of interior and 30 per cent of corner lots must be left free. In the case

of lodging houses 35 per cent of interior and eight per cent of corner lots must be left open. Office buildings located on interior lots may cover 90 per cent of the lot area at and above the second floor, while when they occupy corner lots having an area of 3000 sq. ft. or less, they may cover the entire lot. Tenement houses, or houses accommodating three or more families, may cover 90 per cent of corner lots having an area of not more than 3000 sq. ft., but if located on interior lots more than 90 ft. but not exceeding 105 ft. in depth, 30 per cent of the lot area must remain uncovered. (See pp. 346 to 354.)

In Chicago, tenement houses may not be built nearer than ten feet to the rear lot line, except that when the lot abuts upon a public alley the rear line of the building may be within 16 ft. of the opposite side of the alley. Rear buildings may be erected on a lot only on condition that the minimum distance between front and rear buildings is ten feet, and provided, further, that neither building exceeds one story in height, while five feet additional must be added to the minimum distance for every story more than one of the higher building on the lot, provided that a one-story building, without basement and not used for habitation, may be placed on the rear of a lot containing a tenement house, if a minimum distance of ten feet between buildings is maintained at every point. Courts and shafts are required, which shall increase in size with the number of stories.

In Philadelphia, the only regulation governing the proportion of a lot which may be built upon is that no building for dwelling purposes shall have a frontage of less than 14 ft. and that at least 144 sq. ft. of the lot shall be left open.

Boston requires that where tenement houses have no open space on either side they must have a yard the full width of the building, at least twelve feet in depth in the rear, and the building must not exceed 1800 sq. ft. in area.

In Rochester, tenement houses may not cover more than 70 per cent of the area of the lot.

Mr. V. D. Allen, Commissioner of Buildings, of Cleveland, has proposed a simple method of regulating the size of courts and yards in connection with tenement houses. His suggestion is that the height of the wall which casts a shadow and not the number of stories or the shape or horizontal dimensions of the building should be the controlling factor. At the latitude of Cleveland the sun is 71° above the horizon at noon on June 21st, and he maintains that direct sunlight should reach the bottom of the court or yard at least once during the year, and he therefore proposes fixing the minimum dimension of the court or yard as the tangent of the angle between the sun's rays on June 21st and the vertical or 19° . This tangent is 0.344. He therefore proposes that the depth of the yard or the width of the court should be one-third the height of the wall. He also suggests that in the case of interior courts the length be fixed at one and a half times its width, which would make this length one-half the height of the wall. Where a passageway is provided at the side of the building from the front to the yard in the rear, it is made one-half the width of the court or yard, on the ground that while sunlight is lost a free circulation of air is obtained. This would make the passage at the side of the building one-sixth the height of the adjoining wall, with a minimum of four feet. The minimum width or the depth of rear yards on interior lots he also proposes to make ten feet, while on corner lots the minimum is reduced to eight feet.

As previously noted, regulations governing the portions of building plots which may be occupied are not likely to be opposed, as their necessity is obvious. Those which are designed to limit the height to which buildings may be carried or to improve the appearance of the city are not always accepted as reasonable. It is true that danger from fire or panic increases with the number of stories, but fireproof construction has greatly advanced in recent years, and there has been a great improvement in the devices for controlling fire and rapidly emptying large buildings even when of excessive height. Offices on the highest floors of the American

skyscrapers rent more readily than any others, and they are not only delightfully comfortable but frequently luxurious. Why, then, both owner and tenant are likely to ask, attempt to limit building heights for the sake of the general appearance of the city, and thereby limit the earning capacity of a building and the value of the ground and make it impossible for those who wish comfortable offices on the twenty-fifth or fortieth floor and are willing to pay the price to secure what they want?

Whether the rigid height limitations imposed in Continental, and especially in German, cities are altogether wise, is a debatable question. There appears lately to have been an impression that they have gone too far. Before discussing this question further, let us see just what they are, and for this purpose the same cities whose regulations as to the area of lots which may be occupied will be used as examples.

Berlin limits the height of buildings to the width of the street upon which they front measured between the building lines, but there is a general regulation that the fronts of no buildings for habitation may exceed five stories in height, although the roof may be carried to a greater height provided no part of it projects beyond a line drawn at an angle of 45° back from the top of the front wall. In the case of rear buildings or buildings fronting upon inside courts, which are all too common in this and other German cities, the limits of height are governed by the dimensions of the court, but their height may not exceed by more than six meters the width of the court on which they front, and in no case may it exceed 22 meters.

In Frankfort-on-the-Main front buildings on streets less than nine meters wide may not exceed eleven meters in height. In the center of the city and in the factory district buildings on wider streets may exceed the street width in height by two meters, but may not in any case be more than 20 meters high. In the residential districts of the inner and outer zones no buildings may exceed 18 meters in height, while in the residential and mixed districts of the suburban zone the limit is

16 meters. No dwelling house in any part of the city may be higher than 18 meters. Where the building height is controlled by the street width, two-thirds of the width of front gardens left between the building and the street line may be added to the height. Rear buildings on courts less than six meters wide may not be more than eight meters high. In the central and factory districts their height may exceed the width of the court by two meters, with a maximum height of 20 meters. In the residential and mixed districts of the inner zone and in the mixed districts of the outer zone the maximum height of rear buildings is 13 meters, while in the residential district of the outer zone and the residential and mixed districts of the suburban zone it is nine meters, and in the country district, six meters.

Munich specifies height limits depending upon the street width in the case of buildings in blocks, and imposes a flat limit for four classes of detached buildings. Non-detached buildings may not exceed in height the average width of the street upon which they front, including front gardens, but in no case may they be higher than 22 meters. In streets less than twelve meters wide a height of twelve meters is allowed. Cornices may nowhere be higher than on the street front. Dwellings may not be more than five stories high, including the ground floor. Buildings on the rear of lots may not be more than three stories high, and in no case of a greater height than is permitted for front buildings on the same lot. Detached buildings are divided into four classes, in the first of which 20 meters is the limit of height for both front and rear buildings; in the second, 18 and 12 meters, in the third 15 and 12 meters, and in the fourth, 12 and 9 meters for front and rear buildings, respectively.

Hamburg has less complicated regulations than most German cities. In what are called the city divisions, in contrast with the suburban divisions, no buildings may exceed 30 meters in height. Gable walls may not be more than 30 meters and other types of enclosing walls not more than

24 meters high. In the outer or suburban divisions these heights are very much reduced by prescribing the maximum number of stories above the ground floor, and in some districts houses with more than a ground floor are not permitted.

In Düsseldorf the city is divided into five zones, with the following height restrictions in each:

Zone I, 20 meters,

Zone II, 16 meters, or, where four stories are allowed, 20 meters,

Zone III, the same as for Zone II.

Zone IV, 16 meters.

Zone V, 13 meters, or, where three stories are allowed, 16 meters.

In all of the zones, however, the height of buildings may in no case exceed the width of the streets upon which they abut. While the permissible heights appear in some cases to be the same in different zones, this is due to the fact that the classes of buildings which govern the proportion of the lot area which may be built upon vary in each zone, as described on page 269.

Cologne divides buildings into six classes as to height, these corresponding with the same number of classes as to the part of the lot which must be left free. Classes 1, 2 and 3 relate to non-detached buildings, Class 1 having a limit of 20 meters, Class 2 of 15 meters, and Class 3 of 15 meters where there are basements and 12.5 meters if without basements. Class 4 includes detached buildings, and the limit is 15 meters with and 12.5 meters if without basements. Class 5 includes groups of buildings, and the limits are the same as in Classes 3 and 4, while the sixth is a special class including buildings up to 15 meters in height without basements.

Leipzig simply provides that the height of buildings to the top of the main cornice may not exceed the width of the street upon which they front, while in the central portion of the city this height may not in any case exceed 22 meters.

While in Great Britain considerable attention has been

paid to the securing of better housing conditions and there is a disposition to restrict the proportion of the lot which may be built upon, the regulations affecting the heights of buildings are quite meagre, although limitations of this character are likely to be imposed in connection with town planning schemes undertaken in accordance with the general law of 1909, which is quite fully discussed in Chapter XVII.

Edinburgh was the birthplace of the skyscraper, but the high buildings in that city are perched on the steep hillsides: An Edinburgh lady in conversation with the author severely criticised the tall station hotels at either end of the beautiful garden on Princes street, when he reminded her of the fact that the skyscraper originated in her city, and she in reply pointed out that the proper place for towers or castles was on the hilltops, where they can be seen to advantage and serve to accentuate the topography, but when placed in the valleys their effect is to fill up the low places and detract from the beauty and dignity of the surrounding hills; and the force of her argument will be admitted.

In Birmingham no buildings may be erected to a height greater than 100 ft.

Sheffield since 1900 has limited the height of all buildings to the width of the streets upon which they front, although provision appears to be made for carrying them to a greater height by special permission of the Corporation.

In Liverpool the height of dwelling houses erected in new streets may not exceed the width between opposite buildings abutting on such streets, but there is no limit to the height to which business buildings may be carried.

In cities of the United States differences in the regulations respecting permissible heights of buildings are at least as great as those affecting the required open spaces.

While in New York the labor, tenement-house and other special laws impose a virtual limit upon the height of certain classes of buildings, there is no direct limit prescribed by statute or ordinance except that restricting buildings used as

dwelling to a height of one and a half times the width of the widest abutting street. Office buildings may be carried to any height, the tallest of this class yet erected rising to an elevation of 752 ft. above the street level. A comprehensive scheme of height limitations has been proposed, which is described in detail in Chapter XVIII, (pp. 346 to 354).

In Chicago tenements or dwelling houses may not exceed by more than one-half the width of the widest street on which they front, buildings which are set back from the street line being allowed to add the amount of such setback to the street width in computing the allowable height. Fireproof buildings for office and business purposes may be carried to a height of 200 ft. above the sidewalk level, but prior to September 1, 1911, the limit of height for such buildings was 260 ft.

Philadelphia has no law or ordinance whatever limiting building heights.

In Boston buildings in the business section may not exceed two and a half times the street width, and in no case may be more than 125 ft. high. In other parts of the city the limit of height is 80 ft., except that where but one side of a street is built upon or where a street is 80 ft. or more in width the height may be 100 ft. Wooden dwellings are limited to three stories above the basement, but may in no case be more than 45 ft. above the street level.

Washington imposes a limit of 160 ft. for buildings on its very wide Pennsylvania avenue; 20 ft. more than the street width on other business streets, with a flat limit of 130 ft.; 85 ft. on residential streets provided that on streets over 70 ft. wide the height may not exceed the street width less ten ft.; 60 ft. on streets from 60 to 70 ft. wide, and the street width where that width is less than 60 ft.

Charleston, New Orleans, Cleveland and Fort Wayne restrict building heights to two and a half times the width of the widest street, with absolute limits of 125 ft. in Charleston, 160 ft. in New Orleans and 200 ft. in Cleveland and Fort Wayne.

Buffalo and Rochester limit the height to four times the average least dimension without specific limit in feet, while Toronto, Canada, permits a height of five times the least dimension, with an absolute limit of 130 ft.

A further and more radical step in the direction of regulating or restricting the use of the property outside the street lines is the attempt to specify the uses to which the property may be put. While for many years the conduct of certain noxious trades or occupations has been quite generally prohibited within city limits or has been restricted to certain districts where they would not affect values or discourage other use of neighboring property, the division of the entire city into districts, in each of which is prescribed the use to which private property may be put, is coming to be considered a reasonable exercise of the authority of the municipality. This plan of districting has been most fully developed in the German cities. The districts or zones governing height and area limitations have already been described, but parts of each of them are commonly restricted to business, residential, manufacturing or mixed occupancy. The factory districts are naturally those located along lines of rail or water transportation, but their location with respect to the remainder of the city is sometimes determined by the direction of prevailing winds, in order that smoke and odors may not become a nuisance in the business and residential districts.

A number of American cities have adopted districting regulations, but none of them appears to have gone as far in this respect as Los Angeles. By an ordinance enacted in 1909 the entire city, with the exception of two suburbs, is divided into industrial and residential districts, there being twenty-five of the former and but one of the latter. This does not mean that there is one great unbroken area of the city devoted exclusively to residences. The industrial districts are widely scattered and the residential district includes the remaining area, so that it entirely surrounds many of the industrial districts and really covers the entire

city, with limited areas taken out here and there. Further than this, there are within the residential districts not less than 58 districts designated as "residence exceptions," in which business is permitted subject to certain conditions. The industrial districts vary greatly both in shape and size, the largest including an area of several square miles and the smallest consisting of one single lot. They are generally, however, confined to one part of the city, while their combined area is only about one-tenth that of the residential district. While one of the "residence exceptions" is about half a square mile in area, the others are small, covering not more than two city blocks. The restrictions within the districts are not sweeping. In most of the industrial districts all kinds of business and manufacturing are unrestricted, while certain specific kinds of business are excluded from the residential district; but those not especially excluded are permitted in the "residence exceptions." The owners of 60 per cent of the neighboring property frontage must consent to the establishment of any "residence exception."

Under the provisions of this ordinance the municipal authorities have summarily ejected a number of small businesses, such as laundries, from the residential district, and in one case a brick-yard, established before the district in which it was located became a part of the city and operated for seven years before the law was enacted, was compelled to remove kilns, buildings and machinery, notwithstanding the fact that the land upon which it was located contained deposits of clay which made it more valuable for this purpose than for any other. Appeals have been made to the courts, but the constitutionality of the law has been sustained.

Seattle adopted a building code in 1913 which imposes restrictions upon the use to which property within the city may be put, while the State Legislature of Maryland has by special law regulated the use of property in certain parts of the city of Baltimore. The State of New York in 1913 authorized the municipal legislative body in any city of the

second class, on petition of two-thirds of the property owners affected, to establish residential districts within which no buildings other than single or two-family dwellings may be erected, such restrictions to continue until a similar petition shall have been presented to and approved by the same body. In 1912 the Massachusetts Legislature so amended the general municipal law as to permit any city or town in the state, except Boston, which is covered by special acts, to regulate the height, area, location and use of buildings and other structures within the whole or any defined part of its limits for the prevention of fire and the preservation of life, health and morals, excepting, however, bridges, quays, wharves and structures owned or occupied by the national or state government.

Minnesota, in 1913, authorized the cities of Minneapolis, St. Paul and Duluth to establish residential and industrial districts by a two-thirds vote of the municipal legislative bodies when petitioned for by a majority of the property owners in any proposed district. Authority is given to classify the various industries and to restrict each class to a definite and limited area, while upon a similar majority petition the original restrictions may be set aside or an industrial district may be changed to a residential district, or vice versa. Minneapolis has availed herself of this authority and has created certain industrial and residential districts, but the constitutionality of the ordinances has not yet been determined by the courts.

Wisconsin also, in 1913, conferred quite similar power upon eight of the principal cities of the state, the demand for which powers was indicated by the fact that the Common Council of the City of Milwaukee, some months before the enactment of the state law, adopted an ordinance establishing a business section and prohibiting certain industries anywhere within the corporate limits.

The Provincial Legislature of Ontario, Canada, has authorized the councils of cities having a population of more than 100,000 to enact by-laws restricting the erection of building

of certain classes to designated parts of the city, and Toronto, acting under the provisions of this law, has prescribed the uses to which property may be put in a considerable portion of the city. Under this enactment apartment houses and garages are excluded from most of the residential streets.

It will be seen that the ideas that the municipal authorities have a distinct responsibility for the manner in which cities shall develop, that the right of the general public to protection from unsightly and offensive development must be respected, and that the individual property owner is entitled to a guarantee of the permanence of the character of the district in which he has located his home or his business, have lately taken a firm hold in the United States and Canada. This realization has come slowly, but unless the municipal authorities are carried away by their enthusiasm for a new idea and the regulations which may be imposed are so unreasonable as to defeat their purpose and are overruled by the courts, they have probably come to stay. Sanity in the framing and application of such restrictions is as essential as a realization of the folly and shortsightedness of conceding to the individual the unrestricted right to do as he pleases with his own property, without regard for his neighbors or for the orderliness and sightliness of the city in which he lives, and to the growth and progress of which he owes his success.

CHAPTER XV

THE ENVIRONS OF THE CITY

A SERIOUS defect in most of the city planning which has been done is that the studies and the resulting plans stop abruptly at the city line. While this may have been due in some cases to lack of foresight on the part of the planner or failure to appreciate the fact that the area beyond the arbitrary line now forming the city boundary would some day become a part of the greater city and that the plans of these outlying districts would ultimately have to be corrected and adjusted to new conditions, it is more frequently due to lack of proper authority, to small units of administration or to overlapping authority on the part of a number of bodies or boards having concurrent jurisdiction. There is likely to be a disposition on the part of the smaller towns to resent an intrusion into their territory as an infringement of their independence and their jealously guarded autonomy. As an example, in and about London the Local Government Board, the London County Council, the various local councils, the Board of Trade and the Road Board all have a certain amount of jurisdiction over and responsibility for the development of an adequate system of highways within the different municipalities and roads connecting various centers of population. Each locality is jealous of its own powers, and there is a disposition on its part to consider as conclusive its own views of what may be needed in the way of inter-urban highways; the large aspect of the problem—that of tying together the entire highway system of a thickly settled portion of a country—is apt to be lost sight of. It is said that within fifteen miles of Charing Cross there are ninety local road authorities ac-

ing independently of each other, and that a main road in twenty miles may pass through territory controlled by ten different highway authorities. Concerted action under such circumstances is manifestly very difficult, if not impossible, and while during the last eighty years London and its traffic have increased a hundred-fold, it is said that within that period no new main road has been built leading out of the city.

In the United States, where centers of population were originally established at points remote from each other, these centers were connected by roads which have since developed into important and reasonably direct arteries of traffic, such as those connecting New York with Boston, Albany and Philadelphia, the length of these roads being respectively about 230, 150 and 100 miles. The original highways were crudely located and constructed. The road surface was little more than the native soil, the tractive force required in proportion to the load was very great and the gradients were necessarily light and were secured, not by cutting down hills and filling up valleys, but by detours, short or long, as the topography required. Since the introduction of self-propelled vehicles, with their greatly increased radius of action, the loss of time, energy and money caused by lack of directness in these main highways has been more apparent, and any intelligent plan for their improvement and extension must include the correction of alignment in the existing roads and provision for more direct routes between important centers. The degree of directness which is practicable will depend upon the gradients, which are controlled by the topography, and upon the desirability of slight departures from a generally direct course between focal points in order to give subordinate centers of population convenient access to the main arteries.

It is obvious that a plan for the future development of a city or new portion of a city will have fallen short of completion if it does not take into account the environs of the city. It is seldom possible to do this as effectively through the co-operation of different administrative units as it would be

if a metropolitan planning district were created and some board or commission were given power to make and impose upon the smaller municipalities within its limits a plan which would treat the entire district as a whole. Such a policy is not infrequently followed in the development of comprehensive plans for systems of water supply, sewerage or parks, but rarely, if ever, in the case of a system of highways. Even in contiguous territory, the annexation of which to the city may confidently be expected in the near future, the local authorities, and even private real estate developers, are allowed until the very day of absorption into the larger city or town to proceed with the laying out of streets in an entirely independent manner, as though they were to continue as separate and independent towns, having no relation to each other except that of propinquity. Even the cities of Continental Europe, which have powers to regulate their growth and development that are unknown in America, can, as a rule, exercise control over the planning of the territory outside their limits only through the actual ownership of large tracts of land or, in some cases, through an appeal to the authority of the state. The British Town Planning Act of 1909 is based upon the idea that in a thickly populated country the plan of every town should be considered in its relation to the country about it and to the street systems of contiguous and neighboring towns, all plans being subject to the approval of a central authority whose jurisdiction extends over the whole of Great Britain. The provisions of this act and some of the accomplishments under it are outlined at some length in succeeding chapters.

The street system of every town, whether large or small should be articulated with the highways, not only of neighboring towns, but with those of the next larger political unit the county; and these in turn with those of adjacent counties the main roads of which should form a complete system of state highways. The chief highway joining two towns should form a direct connection with the most important traff

thoroughfares of each. Frequently this is not the case, but the main and sometimes the only adequate road connecting them leads at either end into narrow, tortuous and shabby streets which must be traversed in order to reach the business or administrative center. The impression gained of either will be unfortunate, while the pleasure, comfort and convenience of going from one to the other will be greatly increased if the approach in either case is through a dignified, well-improved street, constantly increasing in importance and interest until the climax is reached at a well-designed and convenient focal point, whether it be a civic center, the business district, a railway terminal or the waterfront. Streets are frequently given a generous width up to the corporate limits of a city, where they connect with important and heavily traveled roads; but their width is abruptly reduced at the boundary, notwithstanding the fact that the city is almost certain to extend its limits, when these roads will become city streets and their widening will be necessary. Roads of this kind should be gradually increased in width as they approach a city and the cost of doing so will be slight if it is done in time. The purpose of a road leading from a city into the surrounding country is not solely that of reaching some objective point in the shortest possible time and by the most direct route. Many of the French roads were laid out "from steeple to steeple" or from one point to another in perfectly straight lines over ridges and across valleys with little regard for easy grades. Such roads, while originally located with a view to military strategy, are becoming more and more used for pleasure traffic. With the greater speed of motor vehicles a slightly greater distance is of little or no importance, particularly when by lengthening the roads somewhat the grades will be improved and they can be made in every way more attractive.

Cities commonly confine their park areas within their corporate limits, but in selecting such reservations the environs of the city should be considered. Some of the most valuable and useful pleasure grounds could profitably be acquired long

before the city limits are expanded to include them, and even though they remain permanently outside the city limits, the people will use them if they are made accessible by transit lines. This subject has been more fully treated and illustrated in the chapter on Parks and Recreation Facilities.

There has lately been marked activity in the plotting and development of suburban tracts. This is largely due to the fact that with improved methods of transportation and cheap fares those who work for small pay are no longer obliged to live where they work or immediately adjacent thereto or even within walking distance. Cheap and quick transportation has enabled them to seek healthy homes for their families in districts which are still essentially rural. To provide houses for them many unrelated developments have been made on the outskirts of all great cities. Where the cities themselves have acquired large areas of land outside their corporate limits, as have so many of the German towns, the sightly and sanitary development of cheap residential property can be insured; but without such ownership there is an obvious necessity of granting greater powers than are now possessed by most cities for the control and development of the surrounding territory.

The unsightly approaches to growing American towns are proverbial. Cheap and hideous groups of houses are much in evidence in their suburbs. This is in marked contrast with the manner in which the towns of continental Europe move solidly outward into the surrounding country, one block at a time. The building stops abruptly and beyond the last developed block is open country, so that the cities appear more compact. Their superficial area is less and the density of population per acre appears to be greater than is the case in British and American cities. The development of these rural districts outside of the built-up territory is not, however, left to chance, especially in the case of the German cities; but long before any building is done the street system is planned after the most careful study, limitations of building heights and the proportion of the lots which may be built upon are determined

and the highways by which the city is to be connected with the neighboring towns which may some day be a portion of it and with others more distant are definitely located.

In the thickly populated countries of Europe and in some of the eastern United States, where the towns are close together and frequently within sight of each other, the spaces between them need planning as well as the towns themselves. Not only should the towns and their immediate environs be considered, but the time has come when still larger units must be taken into account. Mr. Arthur C. Comey has expressed the idea in these words:

All these separate city, town and rural plans, however, even when added to one another leave a gap in the development of the state, because they are not properly correlated so as to produce a cumulative effect. It is state planning that is needed.

In Massachusetts the beneficial results from such a plan would be particularly apparent, as its density of population is greater than that of any other state except Rhode Island, and greater than that of any country in the world except Belgium, previous to the war, and Holland. Partly as a result of this density the interests of its cities and towns frequently overlap and even conflict. In Essex County, for example, with its many hundred acres of wild land and low-valued farms, there is no point more than nine miles from the center of the nearest city of 25,000 or more. Boston's sphere of influence, over which her plan should spread, properly covers the entire metropolitan district, including some 38 cities and towns, each one of which may be planning for its own special interests to the detriment of the district as a whole. Again, Lawrence is growing out into the towns of Methuen, Andover and North Andover, which hem it in on all sides, yet it has no power to insist on the provision of adequate thoroughfares or playground sites for its people.¹

There have been some notable achievements in this direction, such as the creation of the admirable system of parks in the metropolitan district about Boston (Fig. 35, p. 137), the highways leading in every direction from Philadelphia (Fig. 56), the Bronx Parkway, and the Palisades Interstate Park system with its connecting drives (Fig. 36, p. 144). It is doubtful if anything finer or more spectacular has been done than the

¹ *The City Plan Quarterly*, March, 1915.

creation of that part of the Columbia Highway running from Portland, Oregon, up the Columbia River for some sixty odd miles. This road passes through some of the grandest scenery on the continent, winding about mountain spurs 800 ft. above the river, again descending to the river bank, passing at the

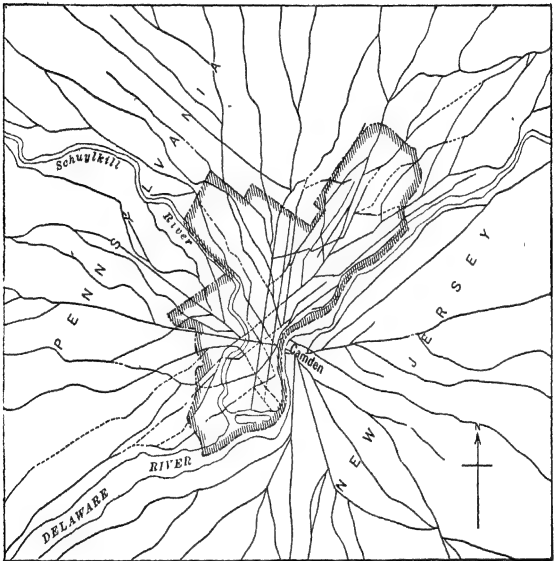


FIG. 56.—Plan showing the system of radial highways leading out of Philadelphia. The dotted lines indicate connections to be supplied both inside and without the city limits.

foot of cataracts hundreds of feet in height and through tunnels with arched side openings like those of the famous Axenstrasse along the shore of Lake Lucerne. Snow-capped mountains are frequently in view, and everywhere there is a perfect roadway with parapet walls of good design, ample lighting where the curves are sharp, and the numerous ravines are spanned by attractive bridges. The unusual features of this road are indi

cated by the illustrations (Pls. 81, 82 and 83, pp. 295 to 299). The entire road as built at the end of 1915 is 363 miles long and has cost \$2,544,000, of which the county in which the city of Portland is located, has contributed \$1,160,000. Minneapolis has taken advantage of an attractive series of lakes, some within and others outside of the city limits, by constructing a series of boulevards between them and around their shores which are of great value to the people of that city. Rochester has been pushing its tentacles out in several directions, providing boulevards and planning the contiguous territory. The city boundary was until recently some four and one-half miles from Lake Ontario; but following the donation to the city by public-spirited citizens of a park of 450 acres on the lake front and the purchase by the city of an adjoining tract for sewage-disposal purposes these areas have been physically connected with the city by annexing a narrow strip containing a highway between them and the city line. On January 1, 1916, the village of Charlotte on the lake front became a part of the city and was connected with it by means of a boulevard which was annexed at the same time. The river itself has been incorporated within the city limits in order that the former port of Charlotte might become the port of Rochester, while narrow strips along the river banks have also been added in order to protect them and make them available for park purposes. It is obvious to the most limited vision that the entire territory between the present city and the lake front will soon be incorporated within the city limits, and it is unfortunate that the city has not the power to see that all of this territory is so planned that it will fit into the plan of the existing city, which, as will be seen by reference to Fig. 18, p. 99, is much better than that of the average town by reason of its well-defined system of traffic arteries extending in almost every direction.

It is impossible to estimate the time within which some of its contiguous areas will become a part of any city. There have been many instances of sensational growth in area and population, one of the best examples of which is Los Angeles. Accord-

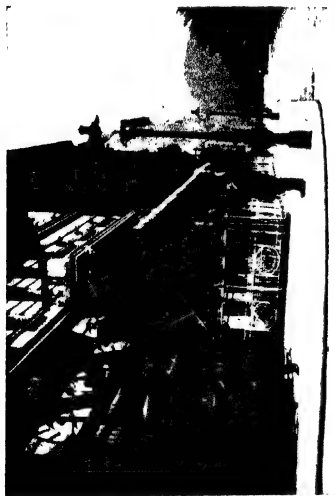
ing to the Federal census the population of this city increased 212 per cent during the decade from 1900 to 1910, and a large portion of this increase was undoubtedly due to the absorption of adjoining areas containing quite populous centers. That this process of absorption is still in progress will be seen by reference to Fig. 4, p. 65, and to Table X, which shows the successive additions to the city since its original incorporation, in 1850, the date and the area added in each case being given in the table.

It is stated that the large San Fernando addition, No. 16, was taken into the city, not with a view to urban development, but in order that the city might use its surplus water supply for irrigating and bringing under cultivation its extensive area, which is greater than all the rest of the city put together.

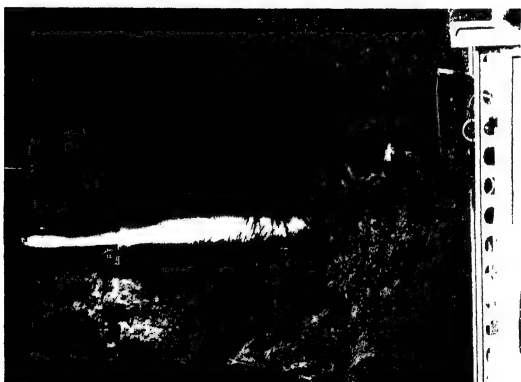
TABLE X.
SHOWING THE AREAS AND THE DATES OF THE SEVERAL ADDITIONS
TO THE CITY OF LOS ANGELES

NUMBER OF ADDITIONS	DATE.	AREA. ACRES.
1 Original city incorporated.	1850	17,924
2	1869	766
3	1895	904
4 and 5.	1896	6,517
6	1899	440
7	1899	1,134
8	1906	11,931
9	1909	6,358
10	1909	2,948
11	1909	5,579
12	1910	2,848
13	1910	7,112
14	1912	4,416
15	1915	4,672
16	1915	108,732
17	1915	2,176
Total		184,457

Some of the States have begun, and in some cases have already created, admirable systems of improved highways which afford excellent connections between the different towns. The State of New York is expending no less than \$100,000,000 in perfecting such a system, the most important links of which



Examples of the obstruction of public streets sometimes found in European cities. Both are from Vienna, on the left a café, on the right a municipal coffee-house. Both views are from photographs by Mr. Geo. W. Tillson (p. 264).



Examples of the scenery along the Columbia Highway in Oregon (p. 292)

are indicated by Fig. 57, which, however, does not show the complete system. It will include some exceptionally fine and impressive stretches involving difficult and daring construction comparable with that of the Columbia Highway, such as the road around Storm King Mountain, high above the level of the

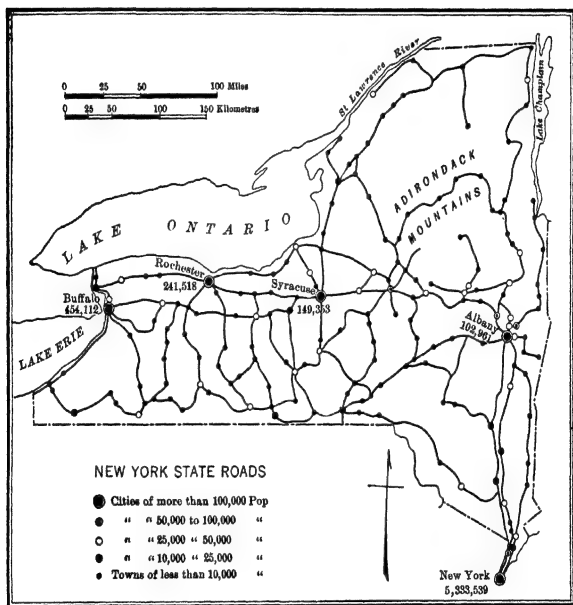


FIG. 57.—An example of a fairly complete system of main roads. Some connecting links are still missing but will soon be supplied.

Hudson River. Some of the towns through which these main highways pass have failed to improve the sections within their corporate limits, and one passing along them is impressed with the rather surprising fact that the only bad pieces of road to be found are in villages or towns of considerable size, while in the rural districts the roads are almost perfect. The central and western states have taken up this work of creating com-

prehensive systems of highways, and in some of them the tendency to adopt the rectangular system, which has been clung to so tenaciously by American cities, is quite apparent, an instance being given in one of the county road systems of

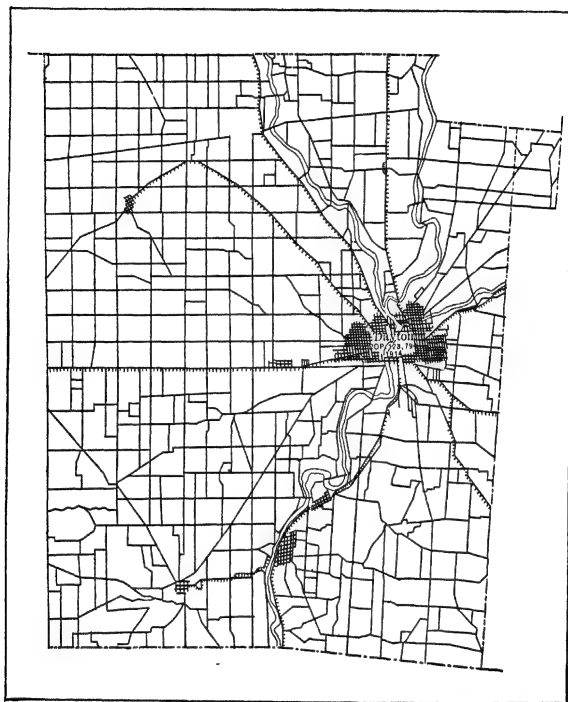


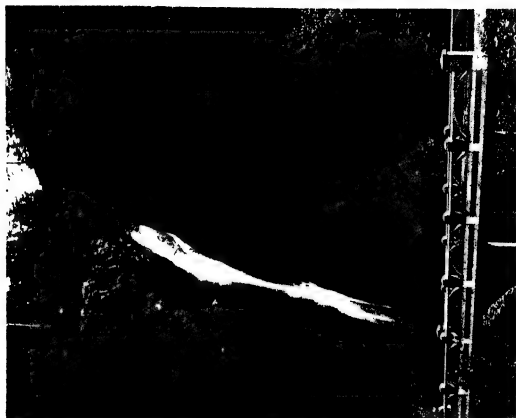
FIG. 58.—A county road system in Ohio, where the rectangular plan is nearly as pronounced as in most American cities.

Ohio (Fig. 58). These improvements are altogether admirable and are of inestimable value, and most of them are prompted by an insistent demand on the part of the public for better traffic facilities, a demand which has become much more impera-

tive since the use of the motor car became general. One of their chief purposes, however, is to furnish pleasant drives or to permit an objective point to be reached quickly and comfortably. Many of these highways have been skilfully located; the amount of detour justified to avoid excessive grades or to reach a point commanding a fine view has been carefully considered, though seldom have those responsible for the location and improvement of these great arteries of traffic, and still less frequently have those using them for business or pleasure, given any thought to the time when the hamlets through which they pass will become prosperous villages and the villages will become cities, each growing outward toward its neighbors and all finally becoming a part of some great metropolitan district, where the problems of housing, of adequate light and air and of recreation; problems of traffic congestion, of transportation and of restrictions upon the use of property will become as acute as they now are in the great city to which they are tributary. Some of these problems, in fact, are already present. The slum is not confined to the large city; some of the worst and most insanitary and debasing conditions are to be found in small towns forming the fringe about a great city, but beyond its jurisdiction, while they are not infrequently met with in small villages in the rural districts. It has often been pointed out that congestion of population is not to be measured by the number of people to the acre or to the city block, but by the number of people to the room.

There is need for real constructive planning of the environs of every city and town; not the subdivision into city lots and blocks of the entire territory round about, which would be a distinct misfortune, but the establishment of lines of direct and easy communication between centers, however unimportant they may be at the time. Future growth will be from these centers outward, and is it visionary or extravagant to urge that every one of these small centers should be connected with neighboring communities by roads which may, if necessary, become part of the highway system of a great urban district? The

sort of control which is needed to insure intelligent planning of this kind cannot be exercised by the cities; it must be undertaken by the state, either through the medium of state laws or by the creation of metropolitan planning boards or commissions whose jurisdiction shall extend over large areas, including a group of populous communities and the intervening districts, or by means of such bodies as the Homestead Commission of Massachusetts, the reports of which have been valuable contributions to city planning literature. It may be that the state cannot delegate to such commissions functions which are of a legislative or quasi-legislative character, such as the imposition of restrictions upon the use of property. The state can, however, establish minimum widths of roads of certain classes, and it probably can prescribe building lines a certain distance back of the highway lines and decree that, if any buildings are erected outside of these lines, no damages may be claimed by the owners in case the strip of land intervening between the highway line and the building line is required in order to widen the road. State institutions—educational, charitable or penal, occupy large groups of buildings covering extensive tracts of land. These have been set down wherever the officials having jurisdiction at the time thought it advisable to locate them or on lands which could be most readily secured for the purpose at the moment. Little serious study appears to have been given to their location, especially their location with respect to each other and, while it may seem a far cry from the location of the public buildings of a city or their grouping to form a civic center to the selection of sites for public institutions scattered over an entire state, the latter problem is not unworthy of careful study, which would doubtless result in the exercise of better judgment than has been shown in such cases in the past.



Views along the Columbia Highway (p. 292)



Some snapshots taken along the Columbia Highway (p. 292).

CHAPTER XVI

GARDEN CITIES

THE origin of what is called the garden-city movement is commonly attributed to the publication in England, in 1899, of a book by Mr. Ebenezer Howard on "Garden Cities of To-morrow," which appears to have been prompted by discussions in England and other countries of the seriousness of the problems presented by the rush of population to the cities and the depletion of the country districts. Mr. Howard described a fanciful garden city laid out on a tract of some 6000 acres of agricultural land worth about \$200 an acre. At its center he proposed a circular garden covering about five acres and fronting on this garden a group of public buildings, such as the town hall, library, museum, theatre, concert hall and hospital. Outside of this he proposed a zone of park and recreation fields covering about 145 acres, and encircling this what he called a "crystal palace," which was simply a ring of glass arcades broken only by the radiating streets, these arcades being used for the display of goods and for leisurely shopping, while their protection from the weather would afford a ready refuge for those using the park and recreation ground in case of storm. Beyond this arcade he suggested five circular roadways upon which residences would be located, the central of the five having the extraordinary width of 420 feet, and outside of this residential zone he proposed to place the factories, warehouses, dairies and farms with a railroad encircling the town and connecting with the tracks of a trunk line. Six radiating streets were to lead directly from the central garden to the outer limits of the proposed town, each of them 120 ft. in width. This town was designed to accommodate 30,000

people. Mr. Howard urged that, while there always must be some main center of population, efforts should be made to keep this center down to 60,000 or less, and that as the number of people in the urban district grows that growth should be from new subordinate centers, all of which should be restricted if possible to about 30,000, each connected by an adequate radial railway with an encircling railroad around the main town and another connecting the inner edges of the subordinate centers or those nearest the main center.

The "back to the land" cry is not new. In 1891, Sir John Gorst in a letter published in a London newspaper stated that in order to check the evils incident to the enormous growth of cities it would be necessary to "back the tide and stop the migration of the people into the towns and get the people back to the land." To one familiar with the peculiar beauty and charm of the English country side and with the love of country life which has always been shown by the leisure class in England, it would seem that of all countries in the world England would be less troubled than others by the mad rush of her people to the cities, and yet in no country has there been so much discussion of the unfortunate results of this drift to the large towns.

Mr. Howard's book aroused great interest in England, and in 1903 an estate of some 3800 acres was purchased in Hertfordshire and the "First Garden City Company" established upon it the town of Letchworth, which was laid out in accordance with plans prepared by Messrs. Barry Parker and Raymond Unwin. This was a complete town with industrial, business and residential districts, and is to-day a self-contained city of 8200 inhabitants.

But examples of the type of development which we call the garden city were to be found long before Mr. Howard wrote his book: at least their prototype antedates the publication of that book by more than a generation. Workingmen's colonies, which may, perhaps, be considered the real parents of garden cities, were established by the Krupps at Essen as early as 1856, but they bear little or no resemblance to the colonies lately

built by this company which, while located, many of them, in the heart of busy industrial cities, are admirable examples of garden city planning. The streets generally are laid out with the studied irregularity so distinctive of German city planning, while trees, shrubbery and open spaces and occasional statues and fountains make some charming street pictures. The individual homes are exceptionally attractive, notably at Margarethenhof, which is a residential colony for the officers and the principal employees of the company, and at Alfredshof, which is exclusively devoted to houses for superannuated employees, a cozy home being provided rent free for each aged couple. The general plans of several of these colonies and views of houses are shown by the illustrations on Pls. 52 to 55 inclusive (pp. 196, 197, 204, and 205).

In 1869, the late Alexander T. Stewart, of New York, established a town on Long Island about twenty miles from what was then New York City, which he named and which is still called "Garden City." It was exclusively a residential town and was laid out about a central park well planted with trees and shrubbery in which was located the railway station and a casino or club house. The streets were broad and the plan was rigidly rectangular; it was a community of tenants only, the founder and, after his death, his estate, retaining complete ownership of all the lands and buildings. The plan originally included some homes for workingmen which were little more than wooden barracks of the most unattractive sort. These have fortunately disappeared, and where they stood is now the remarkable plant of Doubleday, Page & Company, publishers of periodicals and books, most of which relate to country life and in the pages of which are to be found some excellent city planning literature (Pl. 84, p. 310). Since 1895, the owners of the Garden City property have offered residence plots and houses for sale, while contiguous to it there have been several developments of a similar kind by other owners. The rectangular plan was adhered to in the latter developments except in the most recent, where an agreeable variation was made by the introduction of a few curved streets and diagonals in accord-

ance with a design by Mr. Charles W. Leavitt. The original Garden City and the more recent additions still retain their character as residential communities of New York commuters, and have none of the copartnership or paternal characteristics of the garden cities of Europe.

The first garden city in Germany was established at Hellerau, a suburb of Dresden, in 1909, by a private individual and covers 345 acres. The cottages were erected by a cooperative building society and are rented to members only at from \$62 to \$150 a year. These cottages contain water, gas and electric light and complete equipment for heating, cooking and laundry. In a part of the development more pretentious houses are built to rent at from \$200 to \$500 a year. To become a member of the cooperative society, stock of a minimum amount of \$47.60 must be taken. One of the promoters of the German garden cities is quoted by Mr. Howe as protesting that a garden city or suburb is not simply a pleasant town or suburb with a few gardens within its limits, nor should it be confused with the colonies or villas to which land speculators apply the name "garden city" in order to advertise purely commercial enterprises.¹ His definition is this: "A garden city is a symmetrically planned settlement on suitable land which will be in the permanent possession, in the last resort, of the community (estate, society, etc.), in such a manner that land speculation will be altogether prevented and the increment in value assured to the community (even to those of slender means) and shall make it a garden city."

But to return to England, with which country the garden city appears to be most closely associated: the case of Letchworth led to a number of other developments along somewhat similar lines. The increased efficiency of workmen resulting from better housing and healthier surroundings was a sufficient reason, although there doubtless were less selfish ones, to induce Sir William Lever to establish Port Sunlight and Mr. George Cadbury to develop Bourneville in order to give their employees

the advantages of better living conditions. These are really private industrial organizations, as much a part of the Lever and Cadbury plants as are their soap and chocolate factories, and they are exceedingly well managed; but complete control must obviously remain in the hands of the respective companies. It is said that the towns are actually run at a financial loss, but that such loss is more than compensated for by the greater efficiency of the employees. The American workingman and woman would doubtless prefer to attain such increased efficiency through better pay, which would permit them to provide better living conditions for themselves, rather than secure them through what might be called a charity. Not only have the manufacturers who are interested in securing a larger output from their employees adopted the policy of giving more than is represented by the rentals paid, but some cities have followed the same policy in order to improve living conditions. Liverpool, for instance, in trying to get rid of some of its slums has built model tenements to replace them which are rented for less than the actual fixed charges and maintenance expenses, the loss to the city being, it is said, some \$30,000 annually.

While many if not most of the British garden cities have been created for the chief purpose of improving the living conditions of the poorer classes, there are others which, by the adoption of the copartnership plan, have provided attractive homes for those who could afford to pay for such homes if they knew where to find them in surroundings to their liking. At Hampstead, for instance, which is well within the London Metropolitan District, is a development which is designed to meet the needs not only of the mechanic and general laborer, but of those in very comfortable circumstances. In fact, some of the advocates of garden cities urge that the mingling of homes of different cost and occupied by people of different classes and of varied means is calculated to break down the barriers between classes, or at least to bring about a more kindly feeling between them. The original development at the Hampstead Garden Suburb covered about 320 acres. An option on 80 acres

for open spaces was availed of by the London County Council; the remaining 240 acres were taken by the Hampstead Garden Suburb Trust with the understanding that not more than an average of eight houses were to be built to the acre. This would mean an average plot equal to $54\frac{1}{2}$ ft. by 100 ft., or a plot about 74 ft. square for each house. Some of them are rented to working people for as little as \$1.50 a week; others are planned to rent for from \$150 to \$250 a year; still others are considerably larger with correspondingly greater rentals. While a number of the English garden cities have been developed by cooperative societies with a view to housing their members, Mr. Unwin has pointed out that cooperation is too often associated only with the purchase of the estate and the development has been carried out very much on the old lines without full realization of the opportunities offered by real cooperation. In the case of Coöperative Tenants' Societies the roads have been built and the land has been laid out by the parent bodies and sites have been developed cooperatively by the societies themselves.

The growth of the garden city movement in Great Britain is well shown by information contained in a booklet by Mr. E. G. Culpin, Secretary to the Garden Cities and Town Planning Association, published in 1914. He gives a list of 58 estates and societies concerning which particulars are available. The area of a few of these, with the dates when operations began, the number of houses already built, the maximum number of houses allowed per acre, and the minimum and maximum rents are indicated in Table XI.

In addition to the developments included in the table, a few instances will be given showing the rapidity with which such enterprises are frequently carried out. Alkington Estates includes about 700 acres developed on the basis of 12 houses to the acre, with ample provision for recreation grounds and other open spaces. The first house in this development was occupied in July, 1911, since which time the improvement of the roads and the erection of additional buildings has

steadily progressed. Knebworth Estate covers an area of about 800 acres and is being developed on a basis of about 8 houses to the acre. The total number of buildings which it is proposed to erect is about 6400, of which 250 have already been built (Pl. 85, p. 311). Woodlands Mining Village was commenced in June, 1907, for the purpose of housing the workers of the Brodsworth Main Colliery. It was designed to accommodate 653 houses, all of which have already been erected. Although these houses are modest homes for workmen, costing from \$780 to \$1060 to build, the plan is a very attractive one and includes a main avenue 120 ft. in width with four rows of shade trees.

TABLE XI

STATISTICS CONCERNING A FEW OF THE ENGLISH GARDEN CITIES AS COMPILED BY
MR. E. G. CULPIN, IN 1913

NAME OF DEVELOPMENT.	TOTAL AREA ACRES.	AREA DEVELOPED. ACRES.	BEGUN.	NO OF HOUSES BUILT.	POPULATION	MAX. NO OF HOUSES PER ACRE.	MAX. AND MIN. ANNUAL RENTS.
Bourneville	600	138	1879	920	4390	6	\$65-\$150
Ealing	63	40	1901	510	2000	12	\$84-\$280
Hampstead Garden Suburb.	652	180	1907	1550	5000	8	\$75-\$535
Letchworth	4566	800	1903	1876	8200	12	\$55-\$585
Port Sunlight.	223	135	1895	823	3600	10	\$68
Woodlands	127	127	1907	653	3600	5	\$68-\$87
Garden City Tenants	39	39	1905	322	1600	12	\$58-\$296
Oldham Garden Suburb	52 5	17 5	1907	156	750	14	\$77-\$146

The society of which Mr. Culpin is the secretary is apparently engaged in propaganda work, not only in Great Britain but in other countries, and the booklet above referred to contains reports of the progress of this movement in countries outside of Great Britain; but thus far it does not appear to have been taken up seriously in any of the other countries except Germany.

Coöperative and Copartnership Housing Societies have made remarkable progress in England. The "Tenant Co-öperators, Ltd.," was founded in 1888 and the rules then put forward have been in operation without substantial change until the present time and have formed the basis of all the tenant societies since established. Tenants became share-

holders by the holding of a single one-pound share which entitles them to vote equally with any other shareholders irrespective of the number of shares held. In other societies the holdings of the tenants are usually much larger, and recently their voting power has been either restricted or removed. The net profits realized by the "Tenant Coöperators, Ltd.," for twenty-five years, after paying all expenses, depreciation and interest upon loans, deposits and loan stock, has averaged 6.7 per cent upon the amount of share capital, while in 1912 it was 8.3 per cent. Interest upon share capital is as a rule limited to 4 per cent., the surplus profits being distributed in dividends to tenants which have reached as high as 12.5 per cent.

The "Copartnership Tenants, Ltd.," had its beginning in 1901 and some fourteen different societies are affiliated with the parent organization. In 1904, the cost value of their land and buildings was slightly over \$86,000, while in 1914 it was about \$6,250,000, while, if we include the estimated value of the houses when the estates now being developed are completed, it would be over \$17,000,000. It is said that eight of the copartnership estates in the federation which have practically completed their building operations and have property to the value of nearly \$4,000,000 not only have no dwelling of any kind to let, but have waiting lists of applicants.

While garden cities appear to be very popular at the present time in Great Britain, there have been from time to time caustic criticism and vigorous defence of the garden-city movement, especially in the pages of the *Town Planning Review*.¹ It has been argued that in towns we find crowded streets, contiguous buildings, stately squares and long façades, and that human society likes them; that the people have left nature to congregate in cities, and that they appear to wish to stay away from nature. Mr. Edwards points out the absurdity of adopting a picturesque style of architecture for houses in garden cities which often necessitates some of the worst and most insanitary

¹ See especially the articles by Mr. A. T. Edwards and Mr. Charles C. Rea in Vol. IV of the *Town Planning Review*, pages 150, 245 and 312.

features of medieval buildings—the upper floors in the sloping roofs with low ceilings and dormer windows that admit very little light. The external effect may be picturesque, but such houses can hardly be considered good examples of twentieth-century building. “Of what value,” asks the critic, “is it to have an abundance of fresh air outside if our romanticists forbid us to breathe it?” Even in garden suburbs it is said that one often sees a house having a whole wall surface devoid of windows. He further notes that when attractive workmen’s cottages are built on the edge of an industrial district they frequently go untenanted, while a vacant house in the center of the town, even of poor quality, will be immediately taken; and he asks whether the cause of this phenomenon “is not to be found in the fact that the ordinary man likes the company of his fellows and wishes to be in the very hub of things.” The garden suburb is alleged to have “neither the crowded interest of the town nor the quiet charm of the country. It gives us the advantages neither of solitude nor of society. . . . The workingman does not want to traverse long distances to see his friends after his day’s work is done.”

In reply to these criticisms reference is made to the vital statistics of a number of communities, from which it appeared that in “Letchworth the ordinary death rate per 1000 was 6.1 and the infant mortality, 50.6; in Hampstead, 9.8 and 62.0, respectively, while in the Metropolitan borough of Shoreditch they were 18.1 and 123.0; in the borough of Poplar, 16.4 and 107.0, and in the City of Liverpool, 18.1 and 125.0. It is maintained that these statistics alone have justified the garden city. The annual report of the medical health officer for the district in which Letchworth is situated, contains the following statement: “The number of children coming from large, populous towns were anemic, poor of physique, and large numbers were suffering from adenoid growths and throat affections. This state of things is fast disappearing with the new conditions under which they live.” These statistics appear to justify the conclusion that sanitary housing has not been sacrificed to secure

picturesque effect, and it is claimed that ventilation is one of the primary considerations in designing garden city cottages, and that an effort is made to give every window in every house at least 60 degrees of light. It is also pointed out that the modern designs for garden city cottages were arrived at only after many architects had competed in two separate cottage exhibitions in 1905 and 1907, held especially for the purpose. The charge that "in a garden city the garden comes first and the city comes afterwards," is strongly resented, and it is maintained that they both come together in proper proportion and relation to one another.

As to the vital statistics, the critic says that the want of food is just as likely to cause premature death as is the want of air, and expresses the belief that the inhabitants of Hampstead and Letchworth are obviously of the middle class, who "eat their four meals a day with perfect regularity," but that there are thousands of people in the metropolitan boroughs who are just as healthy as they when they have enough to eat. The opponent of the garden city urges that: "A well-arranged town, smokeless and quiet, with its traffic under good control, having houses and streets in close formation; a town which has a sufficiency of parks, squares and other public places, but yet contains considerable population in a relatively small area; a compact town with a limited number of fairly large detached houses just outside of it, immediately beyond which there is nature undefiled: this is an ideal which seems more attractive than the monotonous diffuseness of garden cities."

The tendency to make garden cities look like medieval towns has doubtless subjected them to deserved criticism. It is foolish to make a modern town in which people are living and doing business in twentieth-century fashion look like a medieval Gothic town with all its picturesque inconvenience. The houses so designed may be called dishonest in that they would give the impression that the people in them are living in a manner entirely different from the way in which they actually do live.

In the United States the strong development of individualism makes collective planning difficult, and that may be the reason why relatively few garden cities have been established in this country. If each individual owner may build as he likes and maintain his home without regard for his neighbor's it is obvious that it will be exceedingly difficult, if not impossible, to plan and carry out the development as a whole, including the street system, the public and semi-public buildings and the recreation grounds, the planning all so arranged that each owner may get the greatest benefit from it. It is claimed that if the general planner and the architect work together the result is likely to be much more effective, but this, of course, cannot be done unless there is some central authority which shall exercise a certain degree of control over the arrangement and design of each house. Perhaps the most conspicuous instance of garden city development in the United States is that at Forest Hills Gardens, located very near the business center of New York City and within about fourteen minutes of the Pennsylvania Railway Terminal (Fig. 59, p. 310). A portion of the tract is wooded and it is very near one of the large forest parks of the city. It was established by the Sage Foundation Homes Company, and, in speaking of the considerations which prompted Mrs. Russell Sage and her advisers to undertake the development, Mr. Robert W. DeForest, President of the Company, says:

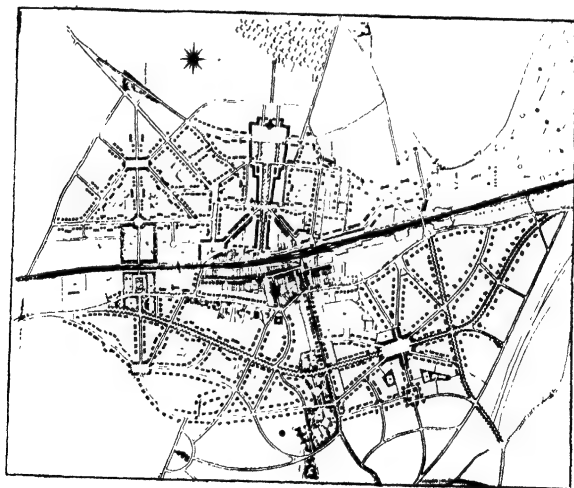
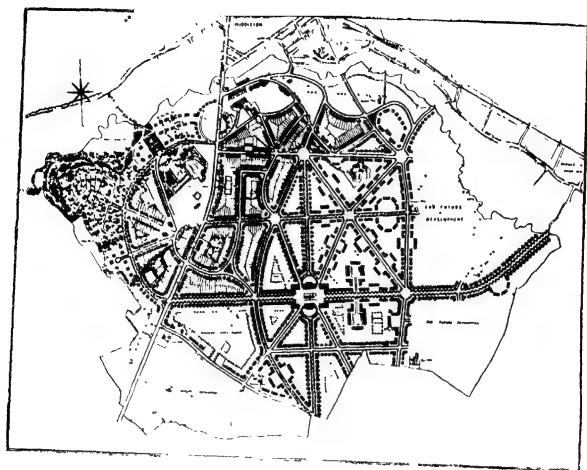
" They have thought that homes could be supplied like those in the garden cities of England, with some greenery and flowers around them, with accessible playgrounds and recreation facilities, and at no appreciably greater cost than is now paid for the same roof room in bare streets without any such adjacency. They have abhorred the constant repetition of the rectangular block in suburban localities where land contours invite other street lines. They have thought, too, that buildings of tasteful design, constructed of brick, cement or other permanent material, even though of somewhat greater initial cost, were really more economical in their durability and lesser repair bills than the



FIG. 59.—General plan of Forest Hills Gardens, showing buildings erected. Reproduced from the progress map of the Sage Foundation Homes Co. (p. 309). See also Pl. 67, p. 251 and Pl. 86, p. 314.



The magazine and book publishing plant of Doubleday, Page & Co. at Garden City, N. Y. General view and detail of the entrance. Reproduced from photographs kindly furnished by the owners (p. 351).



Plans of two typical English garden cities. Above, Alkrington Estate; below, Knebworth Estate. Reproduced by kind permission of Mr E. G. Culpin from "Garden Cities up to Date" (p. 305).

repulsive, cheaply built structures which are too often the type of New York's outlying districts. They have hoped that people of moderate income and good taste, who appreciate sympathetic surroundings, but are tied close to the city by the nature of their occupation, might find some country air and country life within striking distance of the active centers of New York.

"If these expectations can be realized at Forest Hills Gardens, the Russell Sage Foundation will accomplish several objects: It will provide more healthful and more attractive homes to many people. It will demonstrate that more tasteful surroundings and open spaces pay in suburban development, and thereby encourage imitation. It will encourage more economical methods of marketing land.

"No initial outlay has been spared on roads, water supply, sewers and other features which make little show above ground but are fundamental to the permanence of a healthy and attractive residence district. Careful and comprehensive initial layout; attractive, substantial, durable building; experienced management are the keynotes of the enterprise.

"Some people may ask why the first housing plan of the Sage Foundation does not provide for the laboring man, whose wages are small. The Sage Foundation has not forgotten the laboring man; it may be ready to announce something for his benefit later on; but the cost of the land at Forest Hills Gardens, and the character of its surroundings, preclude provision there for the day laborer."

Concerning the general street plan which was adopted, Mr. Frederick Law Olmsted, the landscape architect, writes:

"A principle which has been too generally ignored in American street layouts, is that those streets which are not needed as thoroughfares should be planned and constructed to meet the purpose of quiet, attractive residence streets in the best possible manner. To this end the local streets at Forest Hills Gardens are laid out so as to discourage their use as thoroughfares. While not fantastically crooked, they are never perfectly straight for long stretches; and their roadways, well

paved with bituminous macadam, are made narrow, thus permitting additional space to be devoted to the planting spaces and the front gardens, which will be one of the characteristic features of the whole development. Probably one of the most notable characteristics of Forest Hills Gardens will be the cozy, domestic character of these local streets, where the monotony of endless straight, wind-swept thoroughfares which represent the New York conception of streets will give place to short, quiet, self-contained and garden-like neighborhoods, each having its own distinctive character."

Mr. Grosvenor Atterbury, as the architect, has produced a very interesting lot of dwellings, the monotony which might result from the use of a limited variety of building materials being compensated for through the ingenious variety in design. The illustrations on Pl. 86 (p. 314) show the treatment of the open space at the station and some of the buildings which have been erected, while other details are shown on Pl. 67 (p. 251).

If it was expected by its promoters and by the general public that Forest Hills Gardens would be a place where, not the workingman, but those of modest means with an income say of \$2000 or \$3000 a year could find homes, it must have been a disappointment. The land was too expensive for such a development and, the building construction being of the highest class, only fireproof materials being used, the cost of the houses was high. Fronting on the central or station place is an excellent hotel accommodating from 150 to 200 people and, while the prices are moderate it does not afford cheap living. One thing Forest Hills Gardens has done. It has afforded a much-needed object lesson in its agreeable relief from the rigid rectangular street systems which so generally prevail in American cities.

A development of an entirely different kind is the Billerica Garden Suburb designed by Mr. Arthur C. Comey, of Cambridge, Massachusetts (Pl. 87, p. 315). In describing this development Mr. Comey says that it is the first example in this country of the improved methods of housing for workingmen which have proved so successful in England, and is the first

concrete application of the principles laid down by the Massachusetts Homestead Commission in its report made in November, 1913. This suburb is located at North Billerica, 21 miles from Boston, on the line of the Boston and Maine Railway, which company has here established its repair shops which were opened in February, 1914, with 1200 operatives with a prospect of 2000 to 3000. This enterprise created a great demand for workingmen's houses in a community which was formerly rural, while other manufacturers are locating in the vicinity in order to utilize the supply of labor. It is said that nowhere else in the United States have the five essential elements—site planning, limited number of houses per acre, wholesale operations, limited dividends, and participation by the residents—been combined in an undertaking designed to meet the needs of the workingman earning \$12 to \$20 per week. The tract developed covers 54 acres adjoining the North Billerica station and the former village center, where schools and other public buildings make immediate development possible. It is less than a mile from the new shops and a free workingmen's train carries the men directly from the station to the works. The plan which was prepared by Mr. Comey provides for an average of five to six families per gross acre. Dividends are limited to five per cent cumulative and each resident must be a shareholder. A portion of the tract will be turned over to a copartnership society for development by it in the method so frequently followed in Great Britain. In another section the houses will be sold outright on instalments; in a third section houses will be built for rent, while in a fourth district the railroad company will construct special buildings as required for shops, lodgings, boarding houses, etc.

Developments somewhat closely allied to garden cities have been frequently undertaken on a small scale by individual real estate developers, some of these being located near the centers of large cities, such as the one just outside of San Francisco, the plan of which is shown in Fig. 60, and others well outside the city limits. In many of the former cases the developers have been

obliged to adapt themselves to the street system which has already been imposed upon the district, while in the latter they

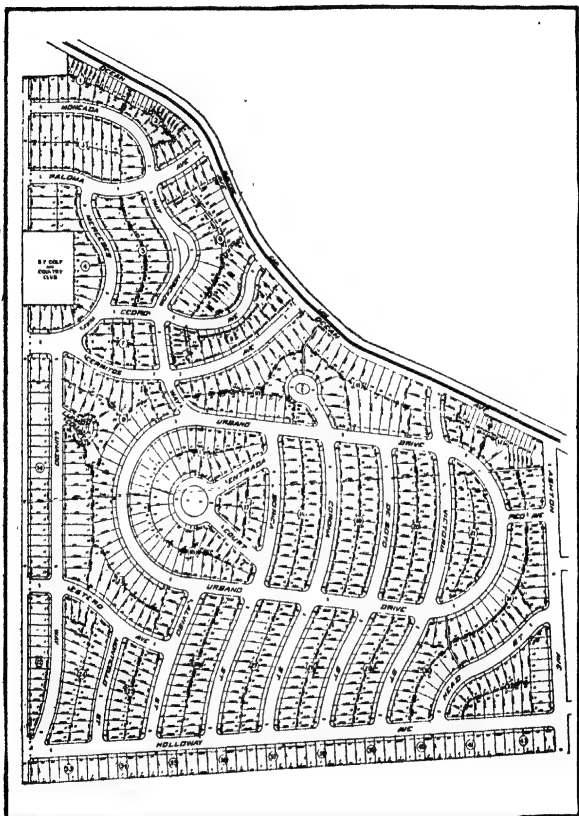
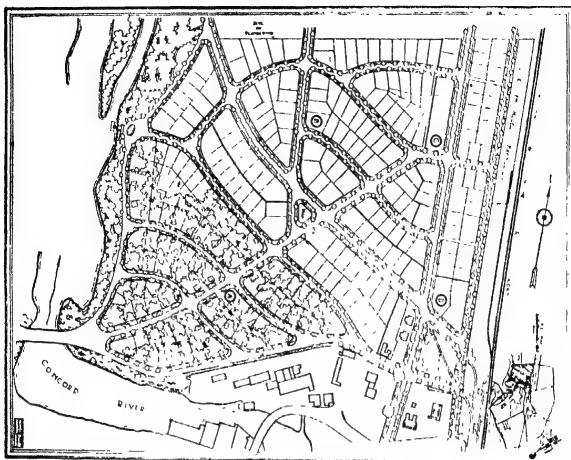


FIG. 60.—Plan of a suburban development in the outskirts of San Francisco.
(See Pl. 68, p. 252 and p. 244.)

have had much more freedom in determining the street lines and block dimensions. The purpose of such developers has usually been to give the property some distinctive character.



Views of "Station Place," Forest Hills Gardens, New York. (See Fig 50, p 310, and Pl 67, p. 251) Reproduced by courtesy of the Sage Foundation
Homes Co (pp 244 and 312)



Plan of, and cottages erected at, Billerica Garden Suburb. A Purchase zone B. Reserved for copartnership C. Renting zone. D Special zone. Reproduced from plan and photograph kindly furnished by Mr. Arthur C. Comey (p. 312).

They have been entirely commercial enterprises, and when the property has been sold the possibility of central control ends and the care of the unimproved lots and of the street planting is either taken over by the city or is voluntarily assumed by an association of the lot purchasers, in which latter case, however, it rarely happens that all of the owners will enter such an association and contribute their fair share of the expense. In some instances the original developers have taken the precaution to insert in every contract of sale a provision that the purchaser shall join with other owners within the limits of the development and consent to an annual assessment of a fixed sum per foot of frontage to meet the expense of caring for the planting, cutting the grass within the street lines, the care of the trees and the removal of snow from the sidewalks. These obligations were supposed to run with the land, and their binding character has been confirmed by the courts. Even with a rigid rectangular street system of the most commonplace type very satisfactory results have been secured in this way, and a few object lessons scattered throughout a great city have had a marked influence upon the general character of real estate development.

In order that a garden city may be intelligently planned and satisfactorily maintained it is obviously necessary that there shall be rigid restrictions governing the character of buildings to be erected, the space between buildings, their location with respect to the street and with respect to each other, the treatment not only of the street itself but of the private property abutting upon it; all of which restrictions must be enforced by some authority which will retain a large degree of control over the entire tract, or by restrictions of record which run with the land and which can be legally enforced, or by mutual agreement between the separate property owners. The success of the development will depend in a great measure upon the intelligence and reasonableness of these restrictions. Those included in the Hampstead Garden Suburb Act of 1906, and those imposed by the Sage Foundation Homes Company,

at Forest Hills Gardens, will be briefly outlined, the former as typical of the garden city developments in Great Britain and the latter as among the first attempts to work out garden city regulations in the United States. In neither case will the restrictions be given in full, but, though much condensed, their general purposes will be indicated. The Hampstead Garden Suburb Act contains certain specific provisions or prohibitions and indicates other things that the company might do if it chose. The important provisions of the act are as follows:

There shall not be built on the average more than eight houses to the acre.

On every road, whatever its width, there shall not be less than 50 ft. between houses on opposite sides of the road free of any buildings except walls, fences or gates.

As to gardens, recreation grounds or open spaces for common use, the company may make regulations fixing the days and times of admission, and for preservation of order and prevention of nuisances, and may impose penalties of not more than five pounds for breaches thereof.

The company may make such charges as it thinks fit for the use of buildings, gardens, recreation grounds and open spaces.

While the company is allowed considerable latitude as to the width of roads and their subdivisions, the following general provisions shall control:

(a) Any existing road 500 ft. in length for the purpose of giving access to a group of houses and not designed for through traffic may, with the consent of the local authority (in this case the Urban District Council of Hendon), be exempted from any portion of any by-laws of the local authority relating to the width of streets and footways, but shall be subject to any by-laws other than these, provided that no such accommodation road shall be less than 20 ft. wide.

(b) The provisions of the Public Health Act of 1875, as to the grading, paving and flagging of streets not repairable by the inhabitants at large, and as to the dedication of such streets as highways shall not, without the consent of the company, apply to any accommodation road so long as it is maintained in good order to the reasonable satisfaction of the local authority.

(c) No road other than an accommodation road shall be less than 40 ft. wide, but need not be of greater width, notwithstanding any future provision of by-laws of the local authority relating to the width of new streets.

(d) If the company provides roads other than accommodation roads of a greater width than 40 ft., the excess over such width may consist of grass margins or grounds planted with trees or laid out as gardens, and shall not without the consent of the company be paved or flagged or taken over by the local authority.

(e) The local authority may, with the consent of the company, take over and maintain as highways any roads which shall have been sewered, graded and fully improved, with proper means of lighting, satisfactory to the local authority, even though such roads may not be of the full width prescribed or may not be otherwise in accordance with the by-laws in force in the district. If the consent of the local authority be withheld, or if any other difference arises between the company and the local authority, the matter in question shall be referred to the determination of an arbitrator appointed by the Local Government Board on application of either party.

In the case of the Forest Hills Gardens the Sage Foundation Homes Company has published the restrictions which are imposed upon all plots sold, with a few exceptions which are noted in the information furnished to prospective purchasers, and these restrictions are recited in their deeds. They are as follows:

No building, fence, wall or other structure shall be erected or maintained nor any change or alteration made therein unless the plans and specifications therefor showing the nature, kind, shape, height, material, color-scheme and location of such structure and the grading plans of the lot or plot to be built upon shall have been submitted to, approved in writing by, and a copy thereof lodged permanently with the Homes Co.

No building or part thereof, except porches, steps, and bay, bow and oriel windows shall be erected or permitted within 25 ft. of any front street or within $12\frac{1}{2}$ ft. of any side street not less than 30 ft. in width.

No building or part thereof shall be erected or permitted within ten feet of the rear line of any lot.

Porches, the floors of which are not higher than the level of the first floor of the building may be built to within 15 ft. of any front street where the building set-back is 25 ft. or more, to within ten feet of any front street where the building set-back is less than 25 ft. and to within $6\frac{1}{2}$ ft. of any side street.

Steps extending not higher than the level of the first floor of the building may be built on such restricted areas, except on those in the rear.

Bay, bow and oriel windows not more than 15 ft. in height may encroach on any of such restricted areas, except on those in the rear, by projecting

thereon not more than three feet; but the total horizontal area of such encroachment on any one side or front shall not exceed 30 sq. ft.

No garage shall be erected within 60 ft. of any front street or within 25 ft. of any other street not less than 30 ft. in width.

Free spaces shall be left on the lot or plot built upon on both sides of every building, extending the full depth of the lot or plot, which free spaces shall be independent of any free spaces pertaining to or required for any other building. No part of any building except porches, steps and bay, bow or oriel windows, shall encroach on these free spaces. The aggregate width of such free spaces on both sides of any building, except to the extent modified in deeds made by the Homes Co., shall be, for buildings 30 ft. or less in width, not less than 15 ft. and for buildings more than 30 ft. in width not less than 50 per cent of the width of the building less fifteen one-hundredths of 1 per cent for every foot of such additional width of building over 30 ft. In no event, however, shall the aggregate width of the free spaces be less than 25 per cent of the width of the building.

The minimum width of such free spaces to be left on either side of any building shall, in the case of a single or detached building, be 35 per cent, and in the case of attached or "block houses" 40 per cent, of the minimum aggregate width of such free spaces.

Porches, the floors of which are not higher than the level of the first floor of the building, may encroach upon such free spaces, but not nearer than three feet to either exterior limit of such free spaces.

Steps extending not higher than the level of the first floor of the building may be built on such free spaces.

Bay, bow and oriel windows, such as are permitted on the restricted areas, may encroach upon the free spaces, but shall, in no event, be built nearer than three feet to either exterior limit of such free spaces.

No building or "block" of buildings more than 250 ft. in width or length shall be erected or maintained.

Before leaving this subject emphasis should be placed upon the fact that the underlying idea of the garden city is not only to provide attractive and wholesome surroundings for the homes of those who, whether from choice or compulsion, are obliged to live in or near large cities or centers of industry. That may be its most obvious purpose, but the movement goes much further. It is really a protest against the extreme centralization which has lately been the tendency in city development. It is designed to encourage the diffusion of business, industry

and population, to make traffic less intensive and movement more comfortable, even though the elimination of "strap hanging" in public conveyances may somewhat reduce the profits of the transportation companies. Both of these ideas were in the mind of Mr. Howard when he wrote the little book referred to at the beginning of this chapter; and while that purpose appears to have been lost sight of in many of the plans which have been proposed and carried out and in most of the discussion of the subject, it should not be overlooked.

CHAPTER XVII

CITY PLANNING LEGISLATION

CITIES of Continental Europe, especially those of Germany, have far broader powers than have those of the United States or Great Britain. It may be generally stated that the former can do almost anything not forbidden by law, while the latter can do only those things which are permitted or directed by general or special enabling acts. In the former the cities are to a large degree independent of the state, although of the ancient free cities under the Hanseatic League only three retain their peculiar privileges which they enjoyed as free cities, namely: Hamburg, Bremen and Lübeck, while Frankfort retained these rights until 1866. These free cities were actually city states, such as Genoa, Florence and Venice once were. In the English-speaking countries the cities are the creatures of the state, and they are constantly reminded of their dependence. It is not, or at least it was not until very recently, unusual for cities in the United States to be obliged to go to the state legislature for permission to make any changes in the city plan, such as a change in the lines of a street, the closing of an existing or the laying out of a new street, the establishment of a new park, or even in some cases the modification of street details, such as the widening of roadways by reducing the width of sidewalks. A large proportion of the laws enacted at legislative sessions dealt with details of this kind, which it would be natural to suppose would be determined by the local authorities. In Great Britain special authority of Parliament was required for municipal improvements, especially those involving the expropriation of private property.

During recent years there has been a disposition to grant to American cities a far larger measure of home rule, municipal legislative bodies being authorized to prepare plans for future development and to modify such plans, once adopted, in all their details. Instead of applying to a state legislature for authority to expend money for certain purposes and to issue their obligations for money borrowed, or to recover the cost of improvements by assessment, the cities are now quite generally left to determine these questions for themselves, with the single provision—and that a wise one—that the total city debt may not exceed a certain percentage of the value of real estate within the city as assessed for the purpose of taxation. This percentage varies in different states, and in some cases debt incurred for increasing or improving the water supply is not included in estimating the city's limit of debt-incurring capacity, as municipal water systems are usually self-sustaining and frequently yield a profit. Again, as in the case of New York City, debt incurred for other projects which return enough to care for interest and amortization of the bonds representing their cost, such as the first rapid transit subway and certain water-front improvements, are also excluded in estimating the limit of bonded indebtedness.

American cities generally are obliged to conduct their business under charters which define in considerable detail the officers to be elected and appointed and the matters over which such officers shall exercise administrative control. These charters are legislative enactments and, while many of them are special laws, there is a tendency in some of the states to prescribe uniform charters for cities of the same class, such class being determined by their population. The most notable development of the home-rule idea for cities is the "commission" form of government. The first application of this idea was in the city of Galveston, Texas. In September, 1900, a violent storm, accompanied by a tidal wave, practically wrecked the city, which is situated on the Gulf of Mexico in an exposed position. The city was already in bad financial condition and

the municipal government was unable to cope with the situation; all of the departments and bureaus were paralyzed, and it was soon realized that administration under a city charter, with the limitations imposed by such an instrument, was almost hopeless under such exigent conditions. It is said that in the two years immediately preceding the disaster the city issued some \$200,000 in bonds to pay ordinary operating expenses, and that payment for current obligations was made in scrip, cashable only at a discount. The commission plan of government was fully launched in February, 1902, when the bonded debt of the city was about \$3,000,000. The new government embarked upon a scheme of permanent improvement which was designed to prevent a recurrence of the disaster which had overtaken Galveston two years before. The most important of these improvements was the raising of the grade of a considerable portion of the city, at an expense of over \$2,000,000, while \$225,000 was expended on sea walls and \$300,000 on drainage. The total amount of bonds issued since the new form of government was adopted has been nearly \$6,000,000, but about \$1,500,000 of the obligations thus incurred has already been paid off and another \$1,500,000 has been devoted to the improvement of the water-works system and other important municipal projects. In 1898, the assessed valuation of the real estate in the city of Galveston was slightly over \$27,000,000, and the tax rate was 1.57 per cent. In 1902, when the commission form of government first became operative, the assessed values had fallen to \$20,749,000. In 1913 the assessed values had risen to \$36,391,745, and the tax rate, which had risen to 1.68 per cent in 1908, had fallen to 1.10 per cent.

Municipal "commission" government is not government by commission, as some of the national or state functions are exercised through commissioners appointed by the executive or created by legislative enactment. The name in general use is said to have been adopted in Galveston for the reason that a majority of the first administrative board were appointed and

"commissioned" by the governor of the state to deal with the special conditions existing in that city. Two years later the members of the board were elected, but the name "commission" has persisted. The Galveston commission consists of five members, one of whom has the title of mayor, although his duties and powers differ little from those of his colleagues. To these men is entrusted the management of the city's affairs, specific functions being assigned to each. The plan worked so satisfactorily in Galveston that it was soon tried in other cities, and at the close of the year 1915 about 400 cities and towns in the United States had adopted it. Des Moines, Iowa, added to the Galveston plan provision for a referendum vote by the people on ordinances, the initiation of municipal legislation by the people, and the recall of elected officials before the expiration of their terms. In the State of New Jersey a law enacted in 1911 provides that any city or town in the state may adopt a commission form of government. The latest development of the idea is the "commission-manager" plan adopted by the city of Dayton, Ohio, at an election held August 12, 1913. This city, like Galveston, had been the victim of a great disaster due to floods in several rivers which unite within or near the city limits; and while the idea was already in the air, its adoption may have been to some extent due to the special conditions following this disaster. A brief abstract of some of the provisions of the Dayton charter will be given as affording a fair idea of its self-governing features and of the "commission plan" with the addition of a city manager.

The powers granted to the city include the right to acquire, construct, lease and operate and regulate public utilities; to appropriate the money of the city for all lawful purposes; to create, provide for, construct and maintain all things of the nature of public works and improvements; to regulate the construction, height and material used in all buildings, and the maintenance and occupancy thereof.

The form of government shall be known as the "commission-manager" plan, and shall consist of a commission of five citizens

elected at large. The commission shall constitute the governing body and appoint a chief administrative officer to be known as the city manager.

Any or all of the commissioners or the city manager may be removed from office by the electors, and the charter stipulates the manner in which such a recall shall be submitted to the voters.

The city manager shall be the administrative head of the municipal government and shall be responsible for the efficient administration of all departments. He shall be appointed without regard to his political beliefs, and may or may not be a resident of the city of Dayton when appointed. He shall hold office at the will of the commission and shall be subject to recall.

The following departments are provided for:

Law, Public Service, Public Welfare, Public Safety and Finance.

The commission may discontinue any department and determine, combine and distribute the functions and duties of departments and subdivisions thereof. A director for each department shall be appointed by the city manager and shall serve until removed by the city manager or until his successor is appointed and has qualified.

The commission may appoint a city plan board, and upon request of the city manager shall appoint advisory boards, the members of which shall serve without compensation.

The commission shall have power to provide for the construction, reconstruction, repair and maintenance, by contract or directly by the employment of labor, of all things in the nature of local improvements, and to provide for the payment of any part of the cost of such improvements by special assessments upon both adjacent and contiguous or other especially benefited property, but the amount assessed against property especially benefited shall not exceed the amount of the benefits accruing to such property. Special assessments shall be by any one of the following methods:

(a) By a percentage of the taxed value of the property assessed,

(b) In proportion to the benefits which may result from the improvement,

(c) By the foot frontage of the property bounding or abutting upon the improvement.

Assessments may be paid in annual instalments, but the number of such instalments shall in no case be greater than the estimated years of life of the improvement.

The city shall pay such part of the cost and expense of local improvements as the commission deems just, which part shall not be less than one fiftieth of the total cost, and in addition thereto the city shall pay the cost of street intersections.

The commission may provide in whole or in part the cost of replacing any improvement existing in a street at the time of the adoption of the charter by levying special assessments as hereinbefore provided; but any assessment for such replacement in less than 15 years from the date of a prior assessment for the improvement to be replaced shall not exceed 50 per cent of the cost of such replacement.

An owner of lots or grounds within the city, who subdivides or lays them out for sale, shall cause to be made an accurate map or plat of such subdivision, describing with certainty all grounds laid out or granted for streets, alleys, ways, commons, or other public uses. Lots sold or intended for sale shall be numbered by progressive number, or described by the squares in which situated, and the precise length and width shall be given of each lot sold or intended for sale. Such map or plat shall be subscribed by the owner and lien holders, acknowledged before an officer authorized to take the acknowledgment of deeds, approved by the Director of Public Service, and recorded in the office of the County Recorder.

The map or plat so recorded shall thereupon be a sufficient conveyance to vest in the city the fee of the parcels of land designated or intended for streets, alleys, ways, commons or other public uses, to be held in the corporate name in trust to and for the uses and purposes in the instrument set forth, expressed, designated or intended.

The Director of Public Service shall be the Supervisor of Plats of the city. He shall provide regulations governing the platting of all lands so as to require all streets and alleys to be of proper width, and to be coterminous with adjoining streets and alleys, and otherwise to conform to regulations prescribed by him. Whenever he shall deem it expedient to plat any portion of territory within the city limits in which the necessary or convenient streets or alleys have not already been accepted by the city so as to become public streets or alleys, or when any person plats any land within the corporate limits or within three miles thereof, the Supervisor of Plats shall, if such plats are in accordance with the rules as prescribed by him, endorse his written approval thereon. No plat subdividing lands within the corporate limits, or within three miles thereof, shall be entitled to record in the recorder's office of the county without such written approval so endorsed thereon.

No streets or alleys, except those laid down on such plat and bearing the approval of the Supervisor of Plats as hereinbefore provided, shall subsequently in any way be accepted as public streets or alleys by the city, nor shall any public funds be expended in the repair or improvement of streets and alleys subsequently laid out and not on such plat. This restriction shall not apply to a street or alley laid out by the city, nor to streets, alleys or public grounds laid out on a plat by or with the approval of the Supervisor of Plats.

The commission may cause any street, alley or public highway to be opened, straightened, altered, diverted, narrowed, widened or vacated. No street or alley hereafter dedicated to public use by the proprietor of the ground in the city shall be deemed a public street or under the care or control of the commission unless the dedication be accepted and confirmed by ordinance passed for such purpose, or unless the provisions relating to subdivisions shall have been complied with.

Property within the corporate limits of the city may be appropriated for any public or municipal purpose and to the full extent of the authority granted by the constitution of the state.

Appropriation of property outside the corporate limits of the city shall be made according to the requirements of and as provided by general law.

Amendments of the charter may be submitted to the electors of the state by a majority vote of the commission and may be submitted by the commission when a petition signed by ten per cent of the electors shall have been filed with the election authorities.

While the recent laws above referred to and the tendencies which they indicate relate more specifically to self-governing powers than to city planning, they are laws which make intelligent planning possible if their provisions are availed of. There has, however, been much legislation recently which is especially intended to promote or to make possible better planning or which should indirectly produce that result. Perhaps the most notable law of this kind is the British Town Planning Act of 1909, and a review of its scope and general provisions and of what has been accomplished through it will not be out of place, the material being taken from the act itself, from the memoranda explaining it which have been issued from time to time by the Local Government Board to the Metropolitan, Borough, Town, Urban and Rural District Councils, from the pages of the *Town Planning Review*, and from information kindly furnished by Mr. Thomas Adams, formerly Town Planning Expert of the Local Government Board, and now Town Planning Adviser to the Canadian Commission of Conservation.

The underlying idea of the act is the prevention of bad development in the future, rather than the removal of existing evils. For that reason the act applies primarily to land in course of development and likely to be used for building purposes, and only secondarily to land already built upon. The object aimed at is the securing of proper sanitation, amenity and convenience. It can be availed of by any local authority and, as soon as application is made to the Local Government Board for authority to prepare a scheme, no compensation will be payable in respect of any building erected or contract made which will contravene

the proposed scheme. Thus, if it is proposed in the scheme to construct a new arterial road between A and B, the authorities may prevent any building being erected on the line of the proposed road from the moment they apply for permission, i.e., before the definite line of the road is agreed upon or made public.

An important consideration which was evidently in the minds of those who devised this law, which applies not only to every great city but to every town in England, Scotland and Wales, is that every urban district has a powerful effect upon and is similarly affected by the territory outside of its corporate limits. The city plan need not be bounded by the red lines indicating the city or town limits. In the last analysis every part of a thickly settled country can either be included within the limits of a town planning scheme or is so powerfully affected by its proximity thereto that the entire territory will inevitably be influenced by the operation of a town planning law so general in its application. Heretofore most projects materially affecting any city, whether that city was great or small, especially one involving the power to compulsorily acquire land, could be carried out only with the express authority of Parliament. Almost the only acts which were quite general in their application were those relating to sanitary housing, such as "The Housing of the Working Class Act" of 1890 and its several amendments. The most liberal enactment, so far as the delegation of powers to local authorities is concerned, was that of 1908 with respect to the corporation of the city of Liverpool. This law provides that the Liverpool Corporation may require any land owner who proposes to develop his property to submit a general scheme for such development, and it may require streets to be of such width as it may prescribe, with the provision that compensation must be paid if a main thoroughfare is required to be more than 80 ft. wide, or any other street more than 36 ft. wide, which is known as the by-law width; that is, the city may require for main thoroughfares the giving, without compensation, of sufficient land to provide a street not more than 80 ft. in width, and compensation is only paid for the area

taken in excess of this width, while for subsidiary streets no compensation is paid except for a width of over 36 ft. The corporation is further authorized to require buildings to be set back any distance from the street, with the proviso that if that distance is more than one-tenth the width of the street, compensation must be made. It will be seen that under this law the city of Liverpool may without cost to the taxpayers require buildings in a new main thoroughfare to be placed 96 ft. apart, and in other new streets 43.2 ft. apart. The corporation is also given the power to prescribe new building lines in old streets, and may require the owners to pull down existing buildings in order to widen a street, in which event compensation is, of course, paid to the owner; but such compensation is reduced by the amount of betterment which accrues to the land-owner in each case. The corporation is also authorized to negotiate with land-owners for a give-and-take line for straightening streets and for the setting apart of land for a public park or open space in exchange for the execution of new street improvements by the corporation without expense to the property owners. The granting of these liberal powers to the city of Liverpool was unprecedented, and the act was adopted after protracted debate and in the face of considerable opposition.

The general act of 1909 applies to the whole of England and Wales and, with slight modifications, to Scotland. Its object, as defined in its opening section, is the "securing proper sanitary conditions, amenity and convenience in connection with the laying out and use of the land and of any neighboring lands." Upon the Local Government Board has been conferred authority formerly exercised only by Parliament itself, the latter retaining, however, certain veto powers. The area which may be included in a scheme is any land which is in course of development or which is likely to be used for building or for open spaces, roads, streets, parks, pleasure grounds or industrial works, and may include land already built upon and even land not likely to be used for building purposes if it is so situated

that it ought to be included in the scheme. The Local Government Board may authorize a local authority to prepare a town planning scheme if the board is satisfied that there is a reasonable need for such a plan. A scheme proposed and adopted by any local authority cannot become effective unless it shall first have been approved by the Local Government Board, which may refuse its approval except with such modifications and subject to such conditions as it may see fit to impose. Before approval by the Local Government Board notice shall be published in the *London* or *Edinburgh Gazette*, as the case may be and, if within twenty-one days of the time of publication no interested person or authority objects to the draft of the order of approval, it becomes law, except that when any scheme includes provisions suspending any general exactment, it shall be laid before both houses of Parliament for not less than thirty days during a session of Parliament; and if before the expiration of thirty days either house presents an address to the Crown against the draft or any part thereof, no further proceedings shall be taken, without prejudice, however, to the making of a new draft scheme. A town planning scheme once adopted may be varied or revoked by the same method of procedure as that followed in its original adoption.

The Local Government Board is authorized to prescribe provisions for carrying out the general objects of town planning schemes, these objects being given in the widest terms in a schedule which is a part of the act, including the laying out and improvement of streets and roads and the closing or diversion of existing highways; the erection of buildings and other structures; the provision of open spaces, both private and public; the preservation of objects of historical interest or natural beauty; sewerage, drainage and sewage disposal; lighting; water supply; the extinction of private rights-of-way or other easements; the disposal of land acquired by the local authorities; the removal, alteration or demolition of any work which would obstruct the carrying out of the scheme; the making of agreements by the local authorities with owners and by owners with each other; the right of the local

authorities to accept any money or property for the furtherance of the object of any town planning scheme, and the regulation of the administration of such money or property; the limitation of time for the operation of the scheme; the co-operation of the local authorities with the owners of land included in the scheme; and the imposition upon land whose value is increased by the operation of a town planning scheme of the sum to be paid on account of that increase in value.

In addition to these general provisions there may be incorporated in any scheme special provisions defining the area and the responsible authority and especially dealing with local conditions, and these special provisions may vary or supersede not only the general provisions, but even acts of Parliament, although when any general act of Parliament is thus contravened, special opportunity is given either house by resolution to reject the scheme before it is finally approved.

A town planning scheme may originate in any one of three different ways:

1. Land-owners may formulate a scheme which the Local Government Board may authorize or after public inquiry may compel the local authority to adopt.
2. Any representation may be made to the Local Government Board that a scheme ought to be prepared by a local authority, and the board may, after public inquiry, order a scheme to be so prepared.
3. A local authority may prepare a scheme if a *prima facie* case is made out and the sanction of the Local Government Board obtained.

The responsible authorities are given abundant power to enforce a proposed scheme by removing any building or work executed in contravention of the scheme before it is approved, but after the date of application to prepare, without compensation to the owner, and by carrying out at the expense of the person in default any work which is so delayed as to prejudice the plan, and the responsible authorities may be compelled by the Local Government Board to exercise these powers.

The expenses incurred by a local authority may fall under three different heads:

1. The cost of preparing and promoting a scheme. The act contains no provision as to this expense beyond the fact that it will be charged in the general tax of the district.

2. The cost of acquiring land for the purpose of carrying out a scheme. Compulsory powers of purchase may be exercised by order of the Local Government Board without statutory confirmation, unless an impartial public inquiry shows that the land is unsuited for the required purpose or cannot be acquired without undue detriment, in which case any order made by the Local Government Board must be confirmed by Parliament. The price to be paid for land compulsorily acquired is to be determined by a single Local Government Board arbitrator, and no additional allowance will be made by reason of the purchase being compulsory.

3. Compensation may be allowed the land-owners for injury, and this compensation is to be determined by a single Local Government Board arbitrator; but no allowance is to be made for the limitation which an adopted scheme may impose as to the number, height, or character of the buildings which may be erected, subject to such limitation being considered reasonable by the Local Government Board, nor for any requirement of a scheme which could be enforced under by-laws, nor for anything done after application has been made for the right to prepare a scheme. The principle of betterment is also recognized to the extent of one-half the increase in the value of property affected by the scheme.

It will be seen that the powers conferred upon the Local Government Board by the Town Planning Act are extraordinary and perhaps unprecedented, and it is quite probable that the success or failure of the act will depend to a large degree upon the manner in which that power is exercised.

A conspicuous difference between the English practice as indicated by the Liverpool act of 1908 and the general town planning law of 1909, and that prevailing in the United States,

is that in the city of Liverpool no compensation need be allowed for land taken in excess of 80 ft. for a principal highway and 36 ft. for a local street, while the municipal authorities have power to compel the setting back of buildings one-tenth the width of the street without compensation, and that under the town planning law the determination of the amount to be paid for land taken and the amount of damage for injury rests with a single arbitrator of the Local Government Board, while no additional allowance is made for the fact that the purchase is compulsory or for the imposition of limitations as to the number, height and character of the buildings which the owner may erect. Such provisions as these are almost unknown in America and would probably be considered grossly unfair; and yet, where the taking of land for streets will convert acreage property into city lots and make them marketable as such, it is difficult to see why any substantial compensation should be made for the land so taken, while in the proceedings to determine the awards to be made for land taken for this purpose the amounts allowed have in many cases been so extravagant that there is a natural reaction against the results secured through commissions composed of "three discreet and disinterested persons," and the British act attempts to cure this trouble by placing the determination in the hands of a single individual.

The year 1913 was especially productive of city planning legislation. The Province of Alberta, Canada, enacted such a law, the general provisions of which, as described by Hon. James W. Davidson, President of the Calgary Plan Commission, at the Conference on City Planning held at Chicago in May, 1913, will be briefly outlined:

A town planning scheme can be prepared for the whole area of any city and may even comprise land outside the city limits, while the minister of municipalities may approve a part of the scheme in case he does not wish to approve all. A scheme, once adopted, may be varied or revoked in case future progress renders it desirable to do so.

A town planning scheme when approved by the minister shall have effect as if it were specially enacted by law. This means that, once a

scheme is approved, all future subdivisions, streets, buildings, etc., must be in accordance with the approved scheme.

The act defines who shall be the authority responsible for carrying out the town planning scheme. Such authority may be, as in the case of Edmonton, the city council itself, or it may be, as in the case of Calgary, a commission appointed by the city council, subject to the approval of the minister of municipalities. Regulations may be adopted for carrying out the objects of the scheme. No such regulations have yet been approved, and Mr. Davidson expresses the opinion that it will take the combined wisdom of the wisest of the world to make this standard set of regulations. In the meantime, the plans are prepared in accordance with the by-laws of the different cities respecting buildings, sewerage, etc.

Any money necessary can be borrowed by debentures, the same as for any other city purpose. They can be paid back either in a lump sum or by annual instalments or by means of a special local improvement tax, the same as is done in the case of pavements and sidewalks.

A special provision to cover the case of Calgary and other cities allows \$20,000 to be paid for preliminary plans out of the current revenue without a vote of the people. In case the scheme should fail of ultimate approval, there would otherwise be no money with which to pay the person or persons preparing the scheme.

Any person whose property is injuriously affected by the scheme shall be entitled to full compensation if he files his claim with reasonable promptness. If lands are increased in value by the carrying out of the scheme, the owner gets one-half of the increase and the city the other half. This is taking the unearned increment in accordance with the English theory of land taxation. One beneficial result expected from this provision is that local jealousies will be avoided, the ratepayers knowing that, although the improvement will be of local benefit, half of the benefit will be reaped by the city at large, while those who most directly profit by it are liable to a charge against their property. This half of the increased value, if not recovered by the ordinary method of taxation or by sale of the lands, may be recovered through an action at law.

The number of buildings on a given area can be limited; the space about buildings, the character and height of buildings may be prescribed; a reservation of vacant land for parks and open spaces in all new subdivisions up to 5 per cent of their area may be made; all without giving the land-owner claim for compensation.

In cases of expropriation the city takes at the value existing before the town planning scheme came into effect. This is designed to prevent owners from holding up the city for fictitious values. On account of the publicity attached to all city enterprises, options cannot be taken as in

private business; but the act provides that the city can purchase at the original value.

The minister of municipalities may force any backward city to make or execute a town planning scheme. He may also certify that the debentures by-laws of a city issuing its obligations to meet the expenses of preparing a scheme are correct, and then no court can question their legality.

The Canadian Conservation Commission has drafted a general town planning act to apply to any province of the Dominion of Canada which may adopt it, which was presented to and discussed at the Conference on City Planning held at Toronto in May, 1914. This act is to be administered under the Department of Municipal Affairs by a town planning board to be appointed by the Lieutenant-Governor in council and consisting of a town planning comptroller, who shall be a permanent and paid executive official skilled in town planning, and who shall act as chairman of the board, a deputy provincial treasurer, a provincial health officer, architect, engineer and deputy attorney-general, all of whom, except the comptroller, shall be members of the central board *ex-officiis*, but none of whom, except the comptroller, shall receive additional compensation other than for disbursements.

Every municipal authority is authorized to create a local housing and town planning board consisting of the mayor, the municipal engineer and health officer, and not less than two rate-payers, to be appointed for two years, one of whom shall preferably be an architect and the other a financier. This board shall have power to acquire, receive, hold, sell, lease and dispose of lands and any interest therein. The municipal authority creating this board shall also have the power to appoint a housing and town planning commissioner, who shall be the executive officer of the local board. It shall be the duty of such local board to prepare and constantly keep up a comprehensive plan of the whole territory, showing tentative schemes both in its developed and undeveloped portions for facilitating the advancement of permanent improvements in sanitation, transportation, conservation and beautification of the mu-

nicipality. The proposed general act further provides that expenses incurred in preparing a scheme shall be paid out of current revenue or from the proceeds of a special tax which shall not exceed one-fiftieth of one per cent of the assessed values of municipalities having a population of under 200,000, and one one-hundredth of one per cent of the assessed value in the case of municipalities having over 200,000 population. The act in general appears to be based upon the British Town Planning Act of 1909, the procedure of which is somewhat simplified, while in other respects it closely follows the Alberta Act.

The state of New Jersey in 1913 enacted a law providing that the mayor of any city of the first class may appoint a city plan commission to consist of not more than nine citizens, while any commissions already existing shall be continued, but with the powers and duties which are conferred by the act upon commissions which may be created under it. It shall be the duty of such commissions to prepare from time to time plans for the systematic and further development of the city. They may consider and investigate any subject tending to the development and betterment of the city and make such recommendations as they may deem advisable concerning the adoption thereof to any department of the municipal government. All questions concerning the location and architectural design of any work of art, statue or memorial within the city must be referred to this commission for its consideration and report before final action is taken. All plats or replats of land within the city limits must be submitted to the commission before they are approved, although approval by the commission does not seem to be required.

The state of New York also enacted city planning legislation in 1913. The New York act authorizes any city or incorporated village to create a city or village planning commission, such commissions in cities of the first class to consist of not more than eleven, in cities of the second class of not more than nine, and in cities of the third class and incorporated villages of not more than seven members, and not more than one-third of the

members in any commission shall hold any other public office. The body creating such planning commissions may at any time provide that the following matters, or any one or more of them, shall be referred to such commission by the municipal board or officer having final authority before action shall be taken, namely:

The adoption of any map or plan, including plans for drainage, sewers, water systems or water-front development or public structures thereon.

The location of public buildings, bridges, statues or monuments, highways, parks, playgrounds, or any other public open spaces.

There are two excellent features of this act. One of them provides that the plan commission may cause a map or maps to be made not only of the city or village or any portion thereof, but of land outside the limits of the city or village which may be so near or so closely related thereto that in the opinion of the commission it should be so mapped. The other attempts to control the platting and sale of land by private individuals, and provides that ordinances may be adopted forbidding the receipt for record or the filing in any office of public record of any plan or plat showing the layout of any highway or street upon private property or of building lines in connection with or in relation to such highway or street until a copy of the plan, plat or description shall have been filed with the commission, and it shall have certified its approval thereof, such certificate of approval being recorded as a part of the record of the original instrument containing such plat or description. This provision, of course, does not apply to cases where a plan is in accordance with a map of the portion of the city in which it is located which shall already have been adopted by competent authority.

CHAPTER XVIII

PROGRESS AND METHODS

HAVING outlined some of the most important legislation relative to city planning, it may be well to review some of the progress made under these laws and the methods which have been followed to secure results either by means of them or without the aid of special statutes. Much was accomplished before the people began to talk about such a thing as city planning. It was realized that conditions were bad, that cities were ugly, that the cost of conducting business, both public and private, was needlessly great, and there were insistent demands for the improvement of these conditions both with respect to the physical plan of the city and the administration of its public business. We often fail to realize what great progress has been made, and that the object lessons thus afforded have been the greatest stimulus to demands for something still better. Perhaps there are New Yorkers who regret the passing of the old days before the advent of the tall building, and think that the city must then have been far more picturesque and interesting. Let us see what the principal street of New York looked like in those days. In 1847 there was published under the title of "New York in Slices" a collection of sketches which had appeared from time to time in the columns of the *New York Tribune*. In one of these will be found the following description of Broadway:

Broadway narrowly escapes being the most magnificent street in the world. If the money expended upon it architecturally had been guided by half a grain of true taste or common sense the effect would have been perfectly glorious. As it is we have the chaotic elements of a noble avenue, the contemplation of which gives us more pain than pleasure. . . . A few

really fine structures here and there meet the eye, but they appear like exhalations from an incredible extent of rubbish. A long, low row of unmeaning outlines and angles that geometry would blush to own; here a brick schoolhouse, there a clapboard barn; now a penitentiary, and then a pound; now stumbling over a rotten cellar door, and anon walking through an obtrusive plate-glass window, stuffed with gaudy cashmeres and mildewed muslins: this is the external appearance of Broadway. You search in vain for even some faint acknowledgment of the line of proportion and continuation, and involuntarily wish for darkness to conceal the jagged and unfinished upper story of magnificent Broadway. . . . But notwithstanding these glaring defects of taste, Broadway is, as times go, a very noble street, altogether the most showy, the most crowded and the richest fashionable thoroughfare on the continent, and surpassed by not more than three or four in Europe.

Speaking of the early morning on Broadway, the writer says:

You look around with a feeling of almost uneasiness. It does not seem that this is the noisy, rattling, bustling, flashing, joyous Broadway to which your steps are accustomed. Soon, however, the sidewalks begin to fill with the clerks and early workers trudging downtown to begin their day. The awakened swine gallop furiously downward to have the first cut of the new garbage which, despite the City Fathers, is sure to have been deposited in the gutters. In an hour or two the great thoroughfare will be alive and the whole city will go surging and thundering through it.

Although due allowance be made for the extravagance of the writer of special articles for publication in the newspapers, the picture drawn by him was doubtless reasonably accurate, and the improvement in the physical aspect of Broadway will be readily acknowledged, an improvement which took place long before city planning as we now understand it was heard of. In Chapter III the conditions which once prevailed in and about Lincoln's Inn Fields were described, but London set about correcting them generations before the British Town Planning Act was dreamed of. The difference between these local and spasmodic efforts to better conditions and the movement which has lately become so general is the difference between cure and prevention. The cure has been found to be frightfully expensive, while prevention is cheap. It is true,

as has so frequently been stated in the preceding pages, that, while much attention has been given to the operation of curing and many costly remedies have been suggested, preventive action has been comparatively rare even when there are abundant symptoms of coming disorder. The British Town Planning Act being the most conspicuous piece of city planning legislation yet enacted, and being especially designed to promote constructive planning and having a preventive rather than a curative purpose, let us see what has resulted from it. According to a review of the progress made in town planning under the act which appeared in the *Town Planning Review* for April, 1914, 50 separate local authorities had at that time made substantial progress in developing their schemes, there being then fully approved or pending 66 plans or schemes covering an area of 110,926 acres. The stages to which these plans had been advanced varied greatly. In two instances only had they been entirely consummated and approved. In three cases the plans had been completed and submitted for approval. In 47 the local authorities had been authorized to prepare the schemes, and in 14 instances application had been made for authority to prepare a scheme. Besides the 50 authorities which had taken positive steps in this direction, 17 others had issued preliminary notices, and in 119 cases the agitation had proceeded so far that decision to issue notices of intention to apply for authority had been reached. The two schemes which had been completed and received final approval covered a combined area of 3762 acres. The three in which the schemes had been completed and submitted for approval covered 6503 acres. Of the 47 schemes where preparation of plans had been authorized, 27, with a combined area of 31,830 acres, were presented by town councils, fifteen, covering an area of 22,364 acres, were presented by urban district councils, and five, covering 17,703 acres, were put forward by rural district councils. Of the 14 applications for authority to prepare schemes, four, covering an area of 5621 acres, were made by town councils; four, covering 7862 acres, by urban district councils, and the remaining six, covering a

combined area of 16,728 acres, by rural district councils. This is certainly an excellent record of progress, especially when the disposition of the British thoroughly to debate any proposed improvement is taken into account. Some of the schemes cover very limited areas, two of them including but six acres each, five others less than 100 acres and six between 200 and 500 acres. Twenty-eight of the schemes cover areas of more than 1000 acres each, while the largest single scheme, which was proposed by one of the town councils, included 6378 acres. The administrative units in the metropolitan area about London are small. Mr. Thomas Adams notes that at conferences on arterial roads and town planning held in London there were representatives of 117 local authorities in Greater London and some 20 local authorities just outside the metropolitan area, and that the total area represented 'comprised about 1083 square miles or 693,120 acres, having in 1901 a population of 6,829,803, which in 1911 had increased to 7,553,400.

He further points out that of the 117 authorities in Greater London, 83 are concerned with the administration of the Town Planning Act, so that the planning of Greater London will have to be accomplished by means of from 80 to 90 schemes dealing with from 100 to 200 different areas of land. There must be some local rivalries and jealousies between the councils of these districts, and if they can, each one doing its share, work out a comprehensive plan for future development, each part of which will fit reasonably well into the whole, the Town Planning Act will have abundantly justified itself.

It may be asked just what these schemes attempt to do, how far they go and what is the nature of the restrictions or regulations which they impose upon owners of property. This can best be answered by giving a specific instance, which the author is able to do through the kindness of Mr. Adams. One of the schemes which has been well advanced is that put forward by the Ruislip-Northwood Urban District Council, the provisions of which include many minute details both with respect to the things that the owners of property may or may not do and

the things that the local authorities may or shall do. The territory covered by this scheme is northwest of London proper, in Middlesex County, and on the outer edge of what is known as Greater London. It includes an area of 5906 acres, and the following summary of the principal provisions of the scheme as amended by the Local Government Board and sent to the District Council to be deposited for one month, in accordance with town planning procedure regulations, will indicate the general scope of the plan:

LIMITATION OF NUMBER OF BUILDINGS TO THE ACRE. In order to deal with the question of the limitation of the number of houses to the acre, the map of the area is divided into sections of about five acres. On these sections, which are known as land units, an average of four, six, eight or twelve buildings to the acre, roads included, must not be exceeded, the number of buildings being designated for each section. These limitations of the number of buildings per acre are to be averaged over the whole land unit, but as many as 20 buildings may be built on any single acre. In the case of a dwelling house being adapted for occupation by more than two, and not more than four families, such dwelling house shall be reckoned as two buildings. If adapted for occupation by more than four families it shall be reckoned as three buildings.

HEIGHT AND CHARACTER OF BUILDINGS. With the exception of public buildings and buildings of a warehouse class, no building shall be erected of a greater height than 60 ft. (exclusive of stories in the roof, etc.) or shall be of greater height than the distance from the main front wall to the opposite boundary of the street. For the purpose of describing the character of the buildings to be erected, various special areas on the map are colored pink and yellow. No building of the warehouse class shall be erected except within a specified area, and no buildings except those erected for the purpose of, or adapted to be used as, shops or business premises shall be erected except within certain areas which include the warehouse area.

The rest of the land included in the scheme is limited to private and professional buildings. The Council may, however, on application, consent to the carrying on of handicrafts and the selling of the products thereof, but none of the products or materials used shall be exposed in the windows. Buildings to be used for agricultural or horticultural purposes may, however, be erected on any part of the area. In regard to the design of the buildings to be erected, if the Council are of opinion that the character of the buildings proposed to be erected, whether on account of the design or the undue repetition of the design, or the materials to be used

would be injurious to the amenity of the neighborhood, the Council may, subject to an appeal to the Local Government Board, require reasonable alterations to be made.

Provisions are also made as to height of windows in room and it is also provided that no bedroom or other habitable room shall have a floor area of less than 70 sq. ft. or contain less than 500 cu.ft. Every new dwelling house shall be provided with at least one living room with a floor space of not less than 144 sq. ft. and containing not less than 1132 cu. ft., and one bedroom having a floor area of not less than 132 sq. ft. and containing not less then 1000 cu. ft.

SPACE ABOUT BUILDINGS. Where building lines are shown upon the map no erection other than boundary walls or fences shall be permitted nearer to the street than such building line. In streets where no building line is shown on the map no building other than boundary walls or fences shall be erected nearer to the center of the street than 30 ft., or nearer to the boundary of the street than 15 ft. This is, however, subject to modification in the case of dwelling houses erected around a quadrangle or other open space. Special provisions are also made in regard to public buildings, buildings on corner sites, shops, etc. In the case of shops, warehouses, schools, etc., such buildings shall not cover more than half of the whole area of the site. In the case of dwelling houses not more than one-fourth of the whole site shall be covered by buildings, though in exceptional cases it is provided that one-third of the site may be so covered.

OPEN SPACES. Certain open spaces indicated on the plan are set apart, some for the purpose of allotments, some for public buildings, some as public open spaces and some for private open spaces. The private open spaces shall be maintained in good order and, when required by the Council shall be fenced by and at the expense of the owner. If such private open spaces or the fences thereof are neglected the Council can do any works necessary and recover the cost from the owner.

STREETS. A number of new streets are shown on the map, and the widening of a number of existing streets is also shown. In respect of any of the new streets shown on the map to be made of a greater width than 40 ft., no owner shall be required to bear any greater expense in the erection of street works than that of the width of 40 ft. Any greater expense shall be borne by the Council. Various provisions are included in the scheme relative to the widening of existing streets. It is also provided that the Council may enter into agreements with owners as to the adjustment of boundaries. A clause relative to the compulsory adjustment of boundaries is also embodied in the scheme.

Anyone laying out a new street in which no buildings other than

dwelling houses are proposed to be erected, may construct such street 26 ft. in width if the following conditions are complied with:

(a) The streets shall not be more than 900 ft. in length.

(b) Turning places shall be provided every 450 ft.

(c) The street shall communicate at each end with a street 40 ft. or more in width, and must not be in direct continuation of such a street; provided that it may communicate with any old highway of less width than 40 ft. which is existing at the present time.

(d) The surface of the road shall be made of the same strength and materials as are required for by law streets.

Further relaxation of by-law requirements as to width of streets is to be given to owners who, when developing their land are prepared to set aside one-tenth of the area of such land as public or private open spaces.

These relaxations are:

(a) A street not exceeding 350 ft. in length may be constructed of a width of not less than 20 ft.

(b) A street not exceeding 750 ft. in length may be constructed of a width of not less than 24 ft.

(c) A street not exceeding 1500 ft. in length may be constructed of a width of not less than 30 ft.

In all cases the provisions named above relating to turning places, communications, etc., shall apply.

Dwelling houses may be arranged around quadrangles, and in this case a street of not less than seven feet in width may be allowed, provided that it is not more than 500 ft. in length and communicates with a street not less than 24 ft. in width or with an existing highway. The space within the quadrangle may be laid out as gardens or as forecourts. No fence fronting on the quadrangle may be more than 3 ft. 6 in. in height.

The Council may construct any of the new streets as shown on the map at any time on giving six months' notice to the owners of their intention. The expenses of making the streets shall be deemed to be expenses of private street works, and the Council shall have power to apportion the expenses on all the lands and premises access to which is derived from such street, and which in the opinion of the Council will be benefited by such street. The Council may prescribe a period of time in which such sums shall be made payable, and in doing so shall take into consideration the time at which the construction of such street will be of benefit to the persons called upon to pay. There is a right of appeal by any person aggrieved by the decision of the Council. An important provision is that no frontager shall be called upon to pay for any street works until his land has been used for other than the purpose of agriculture, unless he has previously given his consent in writing to such charge being made upon him.

Any owner or owners of land over which a new street exceeding 40 ft. in width is shown on the map to be constructed may, where such street or part thereof will, when constructed, communicate at each end with a highway reparable by the inhabitants at large, give to the Council six months' notice in writing requiring the Council to construct the said new street or the said part thereof, and the Council must with reasonable speed after the expiration of such notice construct the said street or the said part thereof. When any plan for a new street is submitted the Council may, by notice in writing, call upon the owners of any lands, the development of which in their opinion may be affected by such street, for plans and particulars showing generally the scheme for the laying out of such estate or lands. Provision is made for the modification of the position or construction of any of the proposed new streets by an appeal to the Local Government Board. Such modifications shall not be made unless all owners affected agree.

NUISANCES. All private gardens, allotments, or private open spaces, shall be kept in such a state as not to be a nuisance or annoyance to persons using the highway or to neighbors. The Council may take steps to abate such nuisances and may recover the costs from any person served with notice. To prevent untidiness or irregularity the Council may by agreements with owners lay out, plant and fence the forecourts abutting upon a street at the cost of the Council or the owners or of both, as may be agreed upon. No person is allowed to fix or use advertisements upon buildings, hoardings or frame work so as to interfere with the amenity of the neighborhood.

The Local Government Board decided that the restrictions as to height and character of buildings and space about buildings are so reasonable that no compensation will be allowed the owners of the property by reason of such restrictions.

While no other country has had such complete legislation and machinery for operating under it as has Great Britain, notable progress has been made under special acts and through the organized effort of private citizens and civic bodies. As has elsewhere been noted, city planning is a tradition in most of the countries of Continental Europe, and we must look to the United States for instances of recent achievement. These are so numerous—some of the projects having already been carried out, some now in progress, others worked out in detail but not yet begun, and still others under discussion—that only a few

of them will be noted, and most of these have already been referred to in preceding chapters. The Springfield civic center is an accomplished fact. The group plans for Cleveland, Denver and San Francisco are well under way. Detroit, Pittsburgh, Seattle, Rochester, New Haven, Bridgeport, Albany, Reading and many other cities have been making studies and have commenced work on some of the details of their new plans. Philadelphia has been systematically working on its comprehensive plan and has made substantial progress toward its realization. Chicago has begun on several of the details of its ambitious plan, while New York, after a number of spasmodic efforts, is now engaged in the fundamental problem of formulating a scheme of zoning for height limitation and the regulation of the use of private property. Some of the legislative acts dealing with city planning have already been reviewed, and note will now be made of the methods which have been followed where no general or specific laws have been enacted and no machinery has been provided. Two distinct steps are necessary: the formulation of a well-defined plan as to what is to be done and the creation of public sentiment which will approve a new plan or a modification of the existing plan and push it until it is carried out. Many cases might be cited as illustrating such methods, but only two will be selected.

New York's efforts to secure, as a preliminary to further intelligent planning, some reasonable regulation as to height and size of buildings and the uses to which land may be put will be first described. On February 27, 1913, the Board of Estimate and Apportionment, on motion of Mr. George McAneny, then President of the Borough of Manhattan, adopted resolutions reading in part as follows:

Whereas, There is a growing sentiment in the community to the effect that the time has come when effort should be made to regulate the height, size and arrangement of buildings erected within the limits of the city of New York, in order to arrest the seriously increasing evil of the shutting off of light and air from other buildings and from the public streets, to prevent unwholesome and dangerous congestion both in living conditions

and in street and transit traffic and to reduce the hazards of fire and peril to life;

Resolved, That the Chairman be authorized to appoint a committee of three members of the Board of Estimate and Apportionment to take this general subject under consideration, to inquire into and investigate conditions actually existing, and to ascertain and report whether, in their judgment, it is desirable to regulate the height, size and arrangement of buildings hereafter to be erected or altered within the city limits, with due regard to their location, character or uses, to examine into the practice and the comparative experience of other cities either here or abroad, and to consider and report upon the question of the legal right of the city of New York to regulate building construction in the manner proposed; and be it further

Resolved, That such committee may also investigate and report whether, in their judgment, it would be lawful and desirable for the purpose of such regulation to divide the city into districts or into zones, and to prescribe the regulation of the height, size and arrangement of buildings upon different bases in such different districts or zones; and be it further

Resolved, That the committee, when appointed, may in turn appoint an advisory commission to aid it in its work, such commission to consist of as many members as the committee may determine, serving without pay, if not already in the employment of the city, but including representatives of each of the several boroughs, and that either the committee or its advisory commission may hold public hearings in each of the boroughs and may use all appropriate means to bring the subject to the attention of the taxpayers and to other persons who may be interested, etc.

This committee appointed an advisory committee of nineteen, of which Mr. Edward M. Bassett was made chairman, and which included in its membership lawyers, engineers, architects, builders, real estate developers, merchants and experts on taxation, housing and finance. A staff of investigators, statisticians and draughtsmen was organized under the general direction of Mr. George B. Ford. A great number of public hearings were given, at which representatives of every interest that would be affected appeared and presented their views. A special investigation was made of the results of the districting methods employed in Europe, and a final report was submitted in December, 1913, which report, with its diagrams

showing the application of the regulations proposed, and its appendices, giving the results of the special investigations which were made, is a valuable contribution to the literature of the subject. The report strongly emphasized the need and reasonableness of establishing districts both for height and use. Of the many forcible arguments advanced, several paragraphs will be quoted:

Manhattan with its skyscrapers is comparatively undeveloped. It is a fact that a large proportion of the area of lower Manhattan is now so poorly developed that the existing improvements are reckoned of no value for purposes of purchase or sale. The bare value of the land is all that is considered. This means that a large portion of the land of Manhattan is very inadequately utilized. Where space is so scarce this inadequate utilization is a great social and economic loss. This partial development and poor utilization of the land is even more apparent in all the other boroughs. A considerable percentage of the land even in what are considered built-up districts, is either vacant or very inadequately utilized. In the suburbs the sprawling character of building development is everywhere apparent. The natural result of a poor utilization of its land area by a city is high rents for occupiers and low profits for investors. It may seem paradoxical to hold that a policy of building restriction tends to a fuller utilization of land than a policy of no restriction, but such is undoubtedly the case. The reason lies in the greater safety and security to investment secured by definite restrictions. The restrictions tend to fix the character of the neighborhood. The owner therefore feels that if he is to secure the maximum returns from his land, he must promptly improve it in conformity with the established restrictions. For example, he will not be deterred from immediate improvement by the consideration that while a detached house is at present an appropriate improvement, it is probable that in ten years an apartment house would be appropriate and that by waiting he will not only be able to reap the advantage of greatly increased land values, but will save great depreciation in the value of the detached house due to the fact that it has become an inappropriate improvement for the lot. . . .

Anything that will tend to preserve the character of a particular section for a reasonable period of years, will tend to bring about the uniform improvement of the section. A large proportion of the land of New York City that is now unimproved or poorly improved is in that condition because the owners feel that the character of the section is changing, is bound to change in the near future or that the permanent character of the

section is unknown. If restrictions were imposed so that the general character of particular sections could be forecasted with reasonable certainty for a period of years, owners who had been holding back on account of the uncertainties of the situation would find it clearly to their advantage to improve their holdings. The result would be that these restricted sections would be more quickly built up with buildings of similar type and use. This should have the effect of improving living conditions, reducing the cost of living and maintaining real estate values.

Any growing city that fails to control building development must inevitably suffer enormous loss due to building obsolescence. Obsolescence may be defined as lack of adaptation to function. It results from changed conditions and surroundings that render the building an inappropriate improvement for the particular location. The total social loss does not consist merely of the great cost of building reconstruction or of the great decline in the rental value of the inappropriate buildings that are not reconstructed, but there is added to this the social loss due to the retardation of real estate improvements owing directly to the obsolescence hazard.

The need for the creation of special restrictions for special districts is most clearly exemplified in the case of suburban residence districts. Here real estate developers have often found it profitable to secure control of large areas in order by restrictive covenants to insure to intending purchasers of homes the creation and maintenance of a residence section of a certain desired type. The surroundings and neighborhood are all important in securing desirable home conditions. Unless the general character of the section is fixed for a considerable period of years no one can afford to build a home. If he does build, a change in the supposed character of the neighborhood through the building of apartments, stores or factories may render the location undesirable for a home of the character he has built and thus greatly depreciate his investment.

The New York City charter authorized the fixing of a height limit for buildings, but did not give the municipal authorities power to prescribe different heights for different parts of the city, and failed to authorize the imposition of any regulation as to uses to which property might be put. The commission, therefore, felt obliged to limit its recommendations to the enactment of a height limitation which, while it might apply to the entire city, was necessarily drawn with a view to meeting the conditions in districts where the high buildings had already been erected. The regulations proposed with this in view were as follows:

STREET WALLS. 1A. Except as hereinafter provided, when the street walls of any building reach a height equal to twice the width of the street, they shall be set back from the street in the ratio of one foot horizontally for each four feet vertically; but the street walls of a building facing on any street, public place, park, or body of water, more than 150 ft. wide, including an intervening street if any, must begin their set-backs not over 300 ft. above the curb, except as hereinafter provided for towers.

1B. Street walls if erected on the building line may reach the height of 100 ft. on a street less than 50 ft. wide before the set-back as stated above must begin.

1C. When the width of a street varies in a given block, the width of the street for the purpose of determining the height of the street walls in said block shall be taken to mean the average width of said street in said block.

2. When street walls are erected inside the building line, so that a space intervenes between the street and the wall, the set-back shall begin where such wall intersects the set-back plane as determined by the set-backs in paragraphs 1A and 1B, and above that point the wall shall be set back in the same manner as if the wall were placed on the building line.

3. Where a single building is erected upon a corner lot facing upon streets of different widths, the street of greatest width may be used to determine the height at which the set-back shall begin. The mean level of the curb in such street of greatest width shall be the point from which such height shall be measured.

4. Where a single building not on a corner lot abuts upon streets of different widths the height and set-backs of each street wall shall be determined by the width of the street on which it abuts.

5. No cornice shall project more than five per cent of the width of the street beyond the building line or the plane determined by the required set-backs in 1A and 1B.

COURTS. 6. Every building may cover the entire area of the lot up to and including the tier of beams forming the ceiling of the first story, which shall be that story the floor of which shall be not more than 7 ft. above the curb level at the highest point of any street on which the building abuts.

7. Except as hereinafter provided, on all lots upon which buildings shall be erected, provision for light and air shall be made by leaving yards or uncovered courts above the second story floor level whose least dimension shall be not less than 6 ft.

8. At any story of a building the least dimension of any court, measured to an opposite wall of the same building or to a lot line, shall equal in feet at least one and a quarter times the number of stories from the

second floor to and including said story. This provision need not apply to a rear yard, as required under paragraph 12.

9. In a court of irregular shape the least dimension shall be taken to mean the least distance between walls or between any wall and a lot line measured on a line erected perpendicular to the center of any side of said court.

10. The provisions of paragraphs 7, 8 and 9 need not apply to a court upon which no office or work room solely depends for access to outside light and air.

11. In every building there shall be a loss in area for each story above the second story floor level of at least one per cent of the lot area, in addition to other requirements hereinafter contained.

12. Except as provided in paragraphs 13A and 13B there shall be an uncovered space above the second story floor level between the rear line of every building and the rear line of the lot, which shall contain not less than 10 per cent of the area of the lot and the least dimension of which shall be not less than 10 per cent of the depth of the lot. When the front and rear lines of the lot are not parallel, the depth of the lot shall be taken to mean the average depth.

13A. The requirements of paragraph 12 shall not apply to a building erected on a lot at the corner of two or more streets.

13B. When a building is erected upon a lot fronting upon two or more streets but not on a corner, there shall be an uncovered space above the second story floor level equal in area to ten per cent of the area of the lot.

14. No courts shall be required in a building erected on a three-sided lot in which three sides face upon public streets and in which the length of the shortest side does not exceed 100 ft.

15. No courts shall be required in a building erected upon a three-sided lot in which only two sides face upon public streets and in which the length of the third side does not exceed 100 ft.

16. No courts shall be required in a building erected upon a rectangular or trapezoidal lot in which three or more sides face upon public streets, and in which the greatest width of the lot from street to street measured in a line at right angles to either street does not exceed 90 ft.

TOWERS. 17. It is further provided, that, in addition to a building erected as hereinbefore provided, a structure to be called a "tower" may extend without limit above such building and without loss of area, but such tower shall not occupy an area exceeding 25 per cent of the area of the lot, and no part of such tower shall approach nearer than 20 ft. to any lot or street line, except, however, that such tower may be built on that building line of a building facing on a public square, a public park,

or the water front, with or without an intervening street as hereinbefore defined in paragraph 1A.

EXCEPTIONS. 18. The above regulations do not apply to tenement houses and do not apply to hotels, lodging houses or theatres in so far as sections 6-16 in relation to courts are concerned, nor do they apply to church spires, belfries or chimneys for power and manufacturing plants. The existing laws and ordinances in relation to tenement houses and hotels, lodging houses and theatres will be continued in force.

The commission gave a number of illustrations to show how the proposed regulations would affect high buildings recently erected, and submitted drafts of two charter amendments which were passed by the State Legislature and became effective on April 21, 1914. These amendments are as follows:

HEIGHT AND OPEN SPACES. Section 242a. The Board of Estimate and Apportionment shall have power to regulate and limit the height and bulk of buildings hereafter erected and to regulate and determine the area of yards, courts and other open spaces. The board may divide the city into districts of such number, shape and area as it may deem best suited to carry out the purposes of this section. The regulations as to the height and bulk of buildings and the area of yards, courts and other open spaces shall be uniform for each class of buildings throughout each district. The regulations in one or more districts may differ from those in other districts.

Such regulations shall be designed to secure safety from fire and other dangers and to promote the public health and welfare, including, so far as conditions may permit, provision for adequate light, air and convenience of access. The board shall pay reasonable regard to the character of buildings erected in each district, the value of the land and the use to which it may be put, to the end that such regulations may promote public health, safety and welfare and the most desirable use for which the land of each district may be adapted, and may tend to conserve the value of buildings and enhance the value of land throughout the city.

The board shall appoint a commission to recommend the boundaries of districts and appropriate regulations to be enforced therein. Such commission shall make a tentative report and hold public hearings thereon at such times and places as said board shall require before submitting its final report. Said board shall not determine the boundaries of any district nor impose any regulation until after the final report of a commission so appointed. After such final report said board shall afford persons interested an opportunity to be heard at a time and place to be specified

in a notice of hearing to be published for ten consecutive days in the *City Record*.

LOCATION OF INDUSTRIES AND BUILDINGS. Section 242b. The Board of Estimate and Apportionment may regulate and restrict the location of trades and industries and the location of buildings designed for specified uses, and may divide the city into districts of such number, shape and area as it may deem best suited to carry out the purposes of this section. For each such district regulations may be imposed designating the trades and industries that shall be excluded or subjected to special regulations, and designating the uses for which buildings may not be erected or altered. Such regulations shall be designed to promote the public health, safety and general welfare. The board shall give reasonable consideration, among other things, to the character of the district, its peculiar suitability for particular uses, the conservation of property values, and the direction of building development in accord with a well-considered plan.

The board shall appoint a commission to recommend the boundaries of districts and appropriate regulations and restrictions to be imposed therein. Such commission shall make a tentative report and hold public hearings thereon before submitting its final report at such time as said board shall require. Said board shall not determine the boundaries of any district nor impose any regulations or restrictions until after the final report of a commission so appointed. After such final report said board shall afford persons interested an opportunity to be heard at a time and place to be specified in a notice of hearing to be published for ten consecutive days in the *City Record*.

A commission was appointed to prepare schemes both for height and space limitations and for restrictions as to use and occupancy, and it is expected that a report will be submitted during the first part of the year 1916. The recommendations will then be open for discussion, and it will be seen whether they will stand the test of public criticism. A few years ago any plan for such regulation would have had little chance of popular approval, but owners of real estate, builders and those who finance real estate and building operations appear to realize the danger of unrestricted building, and to be ready and anxious to favor action which will prevent further congestion, conserve real estate values and stabilize the character of districts where that character is desirable and improve it where it is otherwise; since they see that some reasonable regulation

of the height and bulk of buildings that will prevent the intrusion of business or enterprises which are inconsistent with the established character of a neighborhood is likely to accomplish these results.

A movement of this kind, to be successful, must have public interest and approval behind it. The general public must understand its purpose and the methods by which it is to be attained. That there is such an understanding in New York is shown by a very significant incident. This was the insertion in the daily papers of March 5, 1916, of a full-page advertisement signed by 13 of the leading retail merchants of the city and endorsed by 54 merchants, manufacturers, banks, hotels, clubs and large owners of real estate. The advertisement was headed with the words: "Shall we save New York?—Shall we save it from unnatural and unnecessary crowding, from depopulated sections, from being a city unbeautiful, from high rents, from excessive and illy distributed taxation? We can save it from all of these, so far at least as they are caused by one specified industrial evil—the erection of factories in the residential and famous retail section." They then serve notice that they will give the preference in their purchases to firms whose manufacturing plants are located outside of a specified zone which includes most of the high-class shops and hotels and many of the finest residences. February 1, 1917, is named as the time that the notice will go into effect, in order that the manufacturers now in this zone may be enabled to secure other quarters.

In Chicago we have an excellent example of the development by an unofficial body of citizens of an ambitious scheme for the improvement of a great city by recasting the plan of its most intensively developed section. Mr. Walter D. Moody, Managing Director of the Chicago Plan Commission, in an article on "How to Go about City Planning," says:¹

"Rarely in this country is city planning work initiated by the municipal government. Where this is the case the highest

¹ *The City Plan Quarterly*, March, 1915.

degree of success is not attained. The best results have been had where the city planning movement originated with a group of substantial public-spirited citizens, or under the auspices of commercial or civic organizations. The reason is that at the very outset adequate funds must be had for technical advice and for the conduct of preliminary work to the end that public sentiment may be stirred. Appropriations by city administrations for the first need rarely suffice. This is due to the fear of politicians that the censure of the community would be incurred by invading new and untried fields. Under the ordinary power of a city for making appropriations for corporate purposes the second need cannot be covered at all."

When a city planning project is undertaken in this way it is first necessary to secure funds either through appropriations by some civic organization or by private subscriptions from citizens. In Chicago the work was undertaken and financed by the Commercial Club, while in Brooklyn a similar though less ambitious movement was organized and the funds were raised by a few public-spirited citizens, headed by Mr. Frederick B. Pratt and Mr. Alfred T. White. The next step is to secure a competent expert adviser to make a thorough study of existing conditions, to suggest what should be done and to present the recommendations in a clear and convincing fashion. The preparation of a series of attractive pictures will not suffice. They may arouse a good deal of temporary enthusiasm, but the people who would be likely to get behind a movement of this kind and support it by their influence and money will want to be shown the reasons for and the probable economic results of the carrying out of the suggestions. Many admirable presentations of this kind might be noted, but the list would be a long one and no attempt will be made to enumerate them. Having produced a plan, the next thing is to secure the interest of the general public. Mr. Moody in the article referred to has outlined the policy adopted by the Chicago Plan Commission, an official body appointed by the mayor of the city to advance the carrying out of the plans prepared by Mr. Daniel H. Burn-

ham for the Commercial Club. In naming the members of this commission the mayor pointed out the necessity of taking the public into their confidence "to the end that the whole city and all elements in it may be fully informed as to what is contemplated in this plan for the future." How the commission did this can best be described in Mr. Moody's words:

Actuated by this admonition the commission set out on an elaborate and comprehensive educational propaganda. First there was prepared an 80-page illustrated booklet setting forth the technical proposals in the plan. This was shot through with a strong and exhortive appeal to the citizens to get behind the commission in the promotion of the plan. One hundred and sixty-five thousand copies of this booklet were published and distributed gratis to property owners and tenants paying a rental of \$25 per month and upwards.

Next there was prepared a textbook on citizenship and city planning for use in the Chicago schools. This study was adopted by the Board of Education, since which 45,000 copies have been issued.

Tens of scores of stories of the plan and the purposes of the commission were written and furnished to newspapers and periodicals.

There was organized an effective stereopticon lecture course. The countries of the world were scoured for illustrations and technical data, for use in embellishing the arguments of the lecturer. Thus the Plan of Chicago has been directly presented in more than 300 lectures, and 100,000 citizens have been reached directly in this way. Invitations for the lectures have been received from clubs, societies, business organizations, schools, universities, churches, labor organizations, in fact, from every organized source and from all parts of the city.

The commission has even resorted to moving pictures in its work of publicity, two reels occupying forty minutes having been prepared which are designed to contrast existing conditions with those which would result from the carrying out of the plan. That this propaganda work has been successful is indicated by the fact that funds have been voted by the people for carrying out several of the most important features of the scheme, while one of the most significant results accomplished is an understanding between the city authorities and the Plan Commission that no important work not included in the present plan shall be initiated by the city until it shall have first been referred to

the commission; and it is said that "scarcely a month passes that some council committee or city department does not invoke the advice and assistance of the commission."

If official planning commissions are created, what should be their functions and powers? This subject was ably discussed in a paper prepared by Dr. Robert H. Whitten, Secretary of the Committee on City Plan of the Board of Estimate and Apportionment of New York City at the request of a special committee on administrative procedure of the National Conference on City Planning, which was supplemented by extracts from replies received from thirty-one different individuals and bodies to whom questions had been addressed.¹

The disposition to create new commissions for certain purposes is well expressed by Dr. Whitten as follows:

In American state and city government almost every expansion of governmental activity is initiated through the instrumentality of a new commission. There is a fear of entrusting the working out of new functions to existing officials. Existing officials are already loaded with work and it is thought that they will have neither the time, the inclination nor perhaps the ability to develop the new idea. A new commission, composed usually of unpaid members, is used to plan and care for the new undertaking, at least during its development period. Often the new function fails to take root as a permanent institution and the commission dies. If, on the other hand, the new function becomes a recognized governmental function, it is sooner or later merged with the governmental organization. The new function is transferred to the proper official or department and the commission disappears. That is inevitable; otherwise, municipal government would soon become an utterly disorganized tangle of boards and commissions.

The City Planning movement will doubtless be no exception to the rule. Doubtless the commission method will be used largely in the earlier stages of the movement; but, if the city planning movement endures, it will ultimately be made a part of the general governmental organization. The city plan is so vitally connected with every phase of municipal activity that it must be worked out in as close touch as is possible with the existing administrative and legislative authorities.

¹ Proceedings Seventh National Conference on City Planning, Detroit, 1915.

In discussing the manner in which a plan should be developed, Dr. Whitten says:

The formal confirmation of a tentative comprehensive plan will come slowly. It will probably be inexpedient to ask for an official confirmation of any but the most essential parts of a comprehensive plan developed by the city plan office. The city plan office in formulating its picture of the future city will consider many facts and factors that will necessarily have an important bearing upon its comprehensive plan and which may be tentatively included in the plan, and which it would be unnecessary and inexpedient to submit for official confirmation. . . .

The city plan office should realize at the start that its one big job is the development of a comprehensive plan; that it will not usually be in a position to make a unique contribution to the solution of particular problems until it has this comprehensive picture of the future city. It should, therefore, guard against frittering its time away on numberless apparently urgent and immediate problems and thus lose the opportunity of ever becoming the real controlling force in shaping the future city. This does not mean that the city plan office may not with propriety advise in regard to questions where its preliminary studies show that failure to act would imperil the probable future plan.

Many of the larger cities have established art commissions or juries, the function of which is to examine and report upon the location of and plans for important buildings, bridges and other monumental structures and all works of art, such as fountains, monuments and statues. The question is frequently raised as to whether or not such functions should be combined with or merged in those of the officer, board or commission having control of the city plan. The two problems, however, are quite distinct. An art commission or jury should be composed of art experts, but the kind of ability and experience required to pass judgment upon the city plan is very different, and more satisfactory results have been secured where these functions have been kept entirely separate.

CHAPTER XIX

FINANCING A CITY PLAN¹

THE title of this chapter might almost be expanded into the comprehensive one of "financing a city," to such a large degree does the financing of a city plan include the great number of things that are generally known as city improvements. It would not, of course, include the maintenance of the city schools, which is usually the largest single item in the annual municipal budget, although it would include the location and acquisition of sites for school buildings and provision for proper playgrounds in connection with them. It would not include the cost of administering the departments of public safety, of corrections and charities and the other social activities of the modern city, except, as in the case of the schools, to provide for the proper location and the effective grouping of their buildings where possible. It would include the development of a street and park system and the acquisition of the land needed for them, the location and purchase of sites for and the erection of public buildings of all kinds, bridges, monuments, fountains or other structures which may dignify and adorn a city or may make it more or less ridiculous, depending upon their location and design. It would include a proper and effective scheme of lighting; an adequate system of water supply and all of its appurtenances; provision for drainage and sewage disposal and a general scheme of street pavement, which should not be left to the caprice of the property owners in each street,

¹ A portion of the matter in this chapter is taken from a paper entitled "Paying the Bills for City Planning," presented by the author at the Fourth National Conference on City Planning, held at Boston in 1912, and subsequently issued by the Conference as a separate pamphlet.

and provision for the maintenance and renewal of pavements and the planting and care of trees, which should not be confined to parks and boulevards. All of these things, and more, have a vital influence on the general appearance of a city and should therefore be included in its general plan. To secure them as needed and in proper sequence will require not only wise forethought and the highest technical skill, but sane and prudent methods in financing them.

Some who have written and spoken somewhat oracularly on the subject of city planning appear to believe that the cost of securing a proper city plan consists, first in the expense of a propaganda to arouse a sentiment in favor of the preparation of the plan, and then in paying some experts for a study of the local situation, in more or less surveying, and finally in the making of a lot of maps, studies and pictures. These are exhibited and admired, if the pictures are attractive; a handsomely printed and bound report is issued and talked about for a time; the citizens congratulate themselves upon the fact that their town is soon to become another Paris, and finally some one asks what it is all to cost. The answer, if a frank one, is quite sure to dampen the enthusiasm which has been aroused; the plans are soon forgotten and the pictures put in storage, to be brought out and shown, perhaps, at a few city planning exhibitions. The slow growth of a proper city plan and the years of painstaking work required to produce it have been outlined in other chapters. What concerns us here is the manner in which a rational and comprehensive plan is to be progressively carried out and sanely financed. There are several ways in which the cost of improvements included in the plan can be met: By direct assessment upon the property which would be benefited by each particular improvement, by making the expense a general city charge, or by a combination of the two methods. When the city pays all or a part of the cost the funds for the purpose must be raised in the annual tax levy or they must be borrowed; that is, the city must use either its cash or its credit.

Many European cities have large revenues derived from prof-

itable enterprises in which they have engaged, and in some cases from land speculation. Such municipal ventures are very rare in American cities and are still regarded with suspicion, and the only recourse of these cities is to the method of direct assessment, general taxes or the use of their credit, which is really the same thing as general taxation extended over a term of years.

The feeling is common and not unnatural that if we are planning more for the future than the present coming generations, which will reap the benefit, should bear the greater part of the burden. This is a comfortable sort of theory, but it has led to the adoption of plans of financing improvements by state and city authorities which are not only short sighted, but which are in many cases reckless and indefensible. The state of New York by the vote of its people has authorized the expenditure of \$100,000,000 for the improvement of the state highways, and this enormous sum is raised by the issue of fifty-year bonds. While a portion of the work to be done is undoubtedly of a permanent character, such as the widening and straightening of the roads, the improvement of grades and provision for drainage by substantial structures of masonry or steel, a very large proportion of the expenditure is for road surfaces, many of which can scarcely be expected to last for more than ten years. Borrowing money for fifty years to pay for ten-year roads is obviously unwise.

The state of Maine has adopted a different and quite novel scheme for financing its road improvements. Under a law enacted in 1913 serial bonds, the last of any series being payable within 41 years, were authorized to be issued in amounts not exceeding \$500,000 in any one year, with the provision that not more than \$2,000,000 of these bonds shall be outstanding at any one time, the bonds bearing interest not exceeding four per cent. The peculiar provision of this law is that these bonds are to be cared for from the receipts for automobile licenses. With \$2,000,000 in bonds outstanding and one fortieth of this sum to be retired in any one year, \$130,000 would have to be provided

annually for interest on the outstanding bonds and for the retirement of those falling due. In 1912 the receipts for automobile license fees amounted to about \$100,000; this sum was increased the following year to \$140,000, and in 1914 to about \$180,000. If these increases continue there would appear to be some margin which could be devoted to the annual expenses for the repair and maintenance of the roads. A capitalization of estimated receipts from such a source, which prudence would dictate should be devoted to up-keep, appears to be a dangerous method of financing road improvements, especially in view of the fact that it is highly probable that before the last of any series of bonds will be retired it will be necessary to replace the road surfaces several times, and to meet this expense the entire receipts from automobile licenses over and above the amount required to care for the bonds would probably be needed, and even this might be found inadequate.

Perhaps the most extraordinary instance of reckless financing was that adopted by several towns near New York which have since been incorporated within the city limits. In 1865 the state legislature authorized three of these towns to raise by loan the sums of \$3500, \$6500, and \$2500 respectively, which sums were to be appropriated to the improvement of a certain highway beginning at the Harlem River and passing through the three towns named. The act provided that each town should issue bonds for the amount required to meet the cost of that part of the improvement within its limits, and that these should bear seven per cent interest and should be so drawn as to become due in sums not exceeding \$1000 in any one year. In 1868 the law was amended by substituting for the sums named for each town the words, "such sums as may be necessary." This was the result: the town which was first authorized to spend \$6500 actually expended the sum of \$112,500, some of the bonds being in amounts of \$1000, but most of them \$500. There were altogether 178 different bonds, the last one of which will become due in 1980. The town which was originally authorized to issue \$3500 in bonds actually issued its obliga-

tions to the amount of \$278,000, and the last of these bonds will fall due in the year 2147. These two towns have since become a part of the city of New York, and that city has been obliged to assume all of their obligations, so that in the annual tax budget there appears each year provision for paying off one of the bonds for each of these towns, together with interest at seven per cent on those which remain outstanding. While the first legislative act provided that two towns, now a part of the city of New York, might incur debts aggregating \$10,000, which should be entirely paid off in not more than 13 years, an actual debt of \$390,500 was incurred and saddled upon the city in such a fashion that it could not be entirely paid for 278 years after the first bonds were issued.

It seems easy to pay with borrowed money, particularly when the money can be borrowed for 50 years, or the span of two generations. The habit of paying in this way is easily acquired and is broken with difficulty. When anything is paid for with money borrowed for a period longer than the possible or even probable life of the article purchased, the city's credit is improperly used. A corporation which pays for its betterments from earnings is on a sound basis. When large earnings are used to pay excessive dividends, and betterments and renewals are paid from borrowed money representing additional obligations, there is danger. When interest on existing debt is paid from funds raised by incurring more debt, disaster is imminent. Almost the only source of revenue of most cities is their power to tax. Their credit is due to this power plus the value of their own property. The larger the debt which has been incurred for projects which are not self-sustaining, the greater will be the demands upon a city's taxing power to meet interest and sinking fund charges due to such debt, and the less will be its ability to undertake new improvements and at the same time meet the enormous running expense of the modern city. It might not be a forced comparison to say that the ordinary services which a city renders to the public through its administrative departments, the expenses of which are met by the regular

tax levy, are the dividends which it pays to its stockholders, while for its betterments and renewals it must issue bonds or levy special assessments. Every bond issue requires an increase in the tax levy for a term of years in order to meet interest and amortization charges, curtailing by just so much the amount which can be expended upon municipal housekeeping expenses. In order to keep the tax rate within reasonable limits, expenses which should properly be met from the tax levy are often paid with borrowed money. Is not the city which adopts this policy actually doing the same thing as the business corporation which incurs additional debt in order to pay dividends?

The class of improvements which are commonly considered city planning projects are not self-sustaining. Many of them are actually the correction of defects due to lack of proper planning. In such cases it may be assumed that the property affected by them already has been assessed for the acquisition and improvement of streets which were at the time considered adequate for its local needs. The widening and rearrangement of streets in built-up sections will, however, improve conditions and increase values, and a part of the expense should, therefore, be placed upon the property benefited. In the more fundamental work of city planning, where unoccupied territory is being developed, the property will not have been assessed for improvements, and consequently the acquisition and construction of new streets can properly be assessed upon the adjoining or neighboring property according to benefit, such benefit representing the entire cost in the case of local streets and a portion of the cost in the case of thoroughfares of more than local or even of metropolitan importance. One principle should invariably be recognized: namely, where there is local benefit there should be local assessment. There can be no improvement which has been intelligently planned and executed which will not result in some local benefit, and it follows that there should always be some local assessment. No improvement, however small or large, will be of equal benefit to the entire city, and to distribute the burden of paying for it over the whole city according to taxable values is

unfair in that it is not placed according to benefit. The owners of property in the immediate vicinity are frequently enriched at the expense of those whose holdings are entirely outside the district directly affected.

Some may think that this statement should be so modified as to exclude certain great improvements such as public buildings, bridges, docks and rapid-transit lines, and yet there is doubtless a local benefit resulting from these. It may be urged that such things are not included in what is commonly called city planning. If so, the definition of city planning needs revision, for they certainly are most essential parts of any city plan. The City Club of New York several years ago showed that as a result of the building of the first rapid-transit subway in New York, the actual land values in those portions of upper Manhattan and the Bronx which were most directly affected were within seven years increased \$80,500,000 above the normal increase for that period. The cost of that part of the subway passing through the districts where this rise in values took place was about \$13,000,000, while the cost of the entire subway from the Battery north was \$43,000,000. It is quite evident that if the \$13,000,000 which was spent on that part of the subway traversing the district so notably benefited had been assessed directly upon the property, its owners would still have netted a neat profit of some \$67,500,000, while, had the cost of the entire subway been assessed upon the same limited district, the net profit to the land-owners would have been \$37,500,000. Was it quite fair that property in distant parts of the city, entirely unaffected by this great project, should bear the same proportion of the burden as that which was so conspicuously advantaged? It is true that this improvement is entirely self-supporting, interest and amortization charges being provided from the rental paid by the operating company; but the local benefit was so clearly established that the Rapid Transit Law was so amended as to permit the assessment of any part of the cost of future subways. Many new transit lines are now being built, but it is doubtful if any of them will be self-supporting

for years, the route furnishing the most intensive traffic having been followed by the first line. The property owners along this first route having secured their benefit without direct tax, those along the new lines vehemently and successfully opposed being assessed for theirs.

Assume that an important new building is to be erected in a part of the city where real estate values are relatively low, or at least stationary; that this building—a new city hall, courthouse, library or municipal office building—is to be of a monumental character and is to be provided with a site which will be suitable to its design, or that provision is to be made for a group of such buildings which will ultimately be erected. It is quite certain that the neighborhood in which such a building or such a civic center is to be located will assume a new character, and that the property all about it will be increased greatly in value. It may be doubled, or even trebled, by the time the first of these buildings shall have been completed. Is it fair or just that the owners of the property in its vicinity should be enriched through no action of their own, and that they should bear only the same proportion of the expense, according to the taxable value of their holdings, as will those owning property in distant parts of the city, the value of which will be slightly if at all affected? A considerable portion of the benefit will undoubtedly be general and extend to the entire city, but that there will be also a local benefit cannot be doubted. There may be doubt as to the equity or wisdom of assessing any part of the cost of the building or buildings themselves, although that is a debatable question; but with respect to the effect of location of the site and the erection of the buildings upon the particular neighborhood there can be little question.

It needs no extended argument to prove the equity and wisdom of local assessment wherever there is local benefit. That it has not been done in the past is no reason why it should not be done in the future. That certain property owners have heretofore been treated with prodigal liberality is no good reason why others should fatten through a continuation of an

irrational and essentially unfair policy. To the degree that the assessment plan is adopted, to the same degree will the city place itself upon a cash rather than upon a credit basis. It may be urged that the adoption of such a policy would discourage the agitation for and execution of many desirable city planning projects; that American cities have been slow to appreciate the advantages of intelligent city planning, and now that there has been a marked awakening it would be unwise to suggest the adoption of a policy which might dampen this new-born enthusiasm. A desire for something which involves no direct cost is not a sign of intelligent interest. We are learning that the improvement of our cities pays. That is a hopeful sign. If we have simply reached the stage where we want better conditions only if some one else is to pay the bills, the hope has not a very substantial basis. If we want them badly enough to pay for them ourselves in proportion to the benefit we feel sure will follow, we are making real progress.

Assuming that a case has been made in favor of assessing the cost of all improvements in accordance with prospective benefit, we are still confronted with a very difficult problem. The direct and indirect benefit must be estimated in advance. We cannot first carry out our city planning schemes and afterwards determine how the cost is to be met. Furthermore, we must determine to what extent the benefit will be strictly local, to what degree it will extend to a larger tributary area, and, again, how much it will mean to the entire city or metropolitan district.

In the small town—and no town is so small that these problems will not arise—the creation of a public square about which or in which the chief buildings, including, perhaps, the churches, are to be grouped, is of general interest and benefit to the entire community. All public activities, and even recreation and amusements, will center there, and it will be conceded that the town itself should properly pay the expense. The most valuable property will be that fronting upon this square, so that if its creation will result in special benefit to the surrounding property,

that property will bear a correspondingly large burden. If the main street of the town needs widening, straightening or extending, the benefit again will apply to the entire community. But the town grows and becomes a city. Other main streets must be provided; other centers of activity or recreation are needed. These new projects will still result in some general benefit, but in a large measure of special benefit. The effect upon the property in their neighborhood will be proportionately greater and more exclusive than in the case of the first village green or town square. The entire community will doubtless feel the benefit of the new improvement, but in less degree, as it tends to create a new center and diffuse, rather than concentrate, business and other activities. The town can still afford to contribute towards the expense, but the fair proportion to be assumed by it will be less in proportion to the amount of special benefit resulting to the particular locality. The ability of the town or city to contribute toward the expense of such undertakings will vary in different cases, depending upon the other burdens which it may have assumed or to which it may have pledged its credit; depending upon whether the city is deriving substantial revenue from privileges granted to public service or other corporations or individuals; depending upon whether it is conducting certain activities at a profit or whether they are being conducted at a loss for the benefit of the public using them, and depending especially upon whether the city has already borrowed to such an extent that an issue of further obligations would impair its credit. Again it remains for the town or city to determine, if it is to pay all or a portion of the cost of any particular improvement, and even if its credit is such that it can borrow the funds necessary, whether it will issue its bonds for a long term of years, or whether it will carry out the improvement on a cash basis by providing for it in one or more tax levies or by short-term bonds which will be retired soon after the completion of the work.

In the case of strictly residential streets, the purpose of which is to give light, air and access to the dwellings located upon them,

the benefit will be entirely local, and the entire cost can properly be imposed upon the abutting property. When a highway is given a more generous width, in the expectation that it will be called upon to accommodate a certain amount of through traffic, the benefit is more general, and the assessment area in such a case may be extended to a line midway between it and the next street of more than residential width. The major part of the expense should, however, be confined to the abutting property, so that the cost to it shall be somewhat more than that of a narrower street. In the case of arterial thoroughfares, or in that of the first street to be opened through an undeveloped territory, the effect of which will be to give access to and stimulate the development of a large district, the area of benefit may be correspondingly enlarged. Again, in the case of thoroughfares of exceptional width which it is proposed to treat as boulevards or parkways, the entire city or metropolitan district will be substantially benefited and should bear a portion of the expense; in fact, the state itself may derive an advantage which would justify its assumption of a portion of the cost; but the disposition to recognize such an obligation on the part of the state is exceedingly rare, even though a great city within its limits may, through its large taxable values, contribute the greater part of the state's revenues by which its rural highway system is maintained.

In the case of parks this same principle might be applied. Some small parks are of strictly local benefit, and their cost could properly be placed upon the district in which they are located. Every park, whether small or large, is of some local benefit, even if such benefit were deemed to consist solely in unobstructed light and air to the property on the surrounding streets.

In the case of street widenings or the cutting of new streets through built-up sections, the local advantage is less marked, though it will always follow. The mere fact that a widening or extension is required to accommodate traffic is conclusive evidence that the street has assumed more than local importance.

The width of the road as widened is not an index of its local or general importance. There may be cases where the opening up of a new street of a width commonly given to local streets, and extending for a very short distance, would, on account of its strategic position, be of great general and of little local benefit.

It is quite apparent that the relative local, district, or general benefit of any street or other improvement can be determined neither by its dimensions nor its cost. An improvement involving an expenditure of \$1,000,000 in one part of the city may be more distinctly local in its beneficial effect than one costing \$50,000 in another section. No fixed rule can be established to govern the distribution of expense. It must be determined in each case after a painstaking investigation. Such investigation should not be intrusted to a different individual, board or commission in each case. There should be a permanent body which should act in all cases. This body should not be large, and it should be so constituted that its entire personnel could not be changed at once, thus insuring continuity and consistency of policy. They should be broad men whose training should have fitted them for their difficult and delicate duties. The misleading evidence commonly called expert testimony as to existing and prospective values will be of little assistance to them. They should be qualified by experience and intelligence to form their own conclusions.

While no definite rule can be adopted to govern the distribution of assessments representing the district and general benefit, it should be possible to prescribe a method of determining the amount and extent of local benefit, particularly in the case of new streets, boulevards and parks. Let us assume that 60 ft. is the maximum width required for a local street; then the entire cost of acquiring and improving all streets 60 ft. or less in width may properly be placed upon the property within a half block on either side of the street. In the case of wider streets that proportion of the cost represented by the ratio which 60 ft. plus 25 per cent of the excess over 60 ft. bears to the width of the street would probably be

an equitable proportion to assess upon the local district. Up to a certain limit property fronting a wide street is more valuable, and it would manifestly be unfair to adopt a rule which would result in making the cost of acquiring a street 70 or 80 ft. wide no greater or possibly less to the abutting owner than would have been the cost of a street 60 ft. wide. On the other hand, after a street reaches certain proportions, additional width will not involve additional benefit. It may be assumed that a share of the expense which would be equivalent to paying for a street

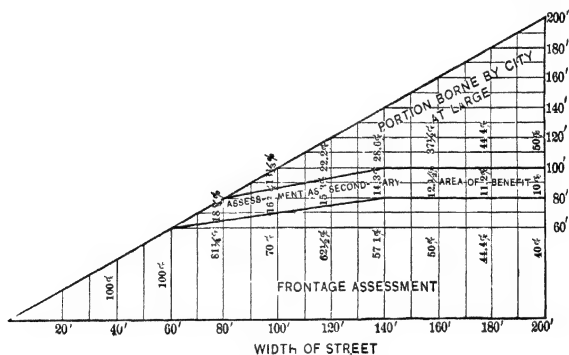


FIG. 61.—Diagram showing proposed distribution of the cost of acquiring streets of different widths between the abutting property and larger areas of benefit.

80 ft. wide should represent the limit of local assessment. This limit would be reached under the rule proposed when the street becomes 140 ft. wide. The percentage of cost which would be locally assessed would, therefore, be as follows for various street widths: 60 ft., 100 per cent; 70 ft., 89.3 per cent; 80 ft., 81.25 per cent; 90 ft., 75 per cent; 100 ft., 70 per cent; 120 ft., 62.5 per cent; 140 ft., 57.1 per cent; 150 ft., 53.3 per cent; 200 ft., 40 per cent. The suggested plan of distribution is shown diagrammatically by Fig. 61.

In the case of parks the problem is more difficult, the amount of local assessment and the extent of the area of local benefit

being determined by the size and shape of the park and facility of access to it from other parts of the city. In any case, no rule should be adopted until it has been carefully tested and it has been demonstrated that the assessments levied in accord-

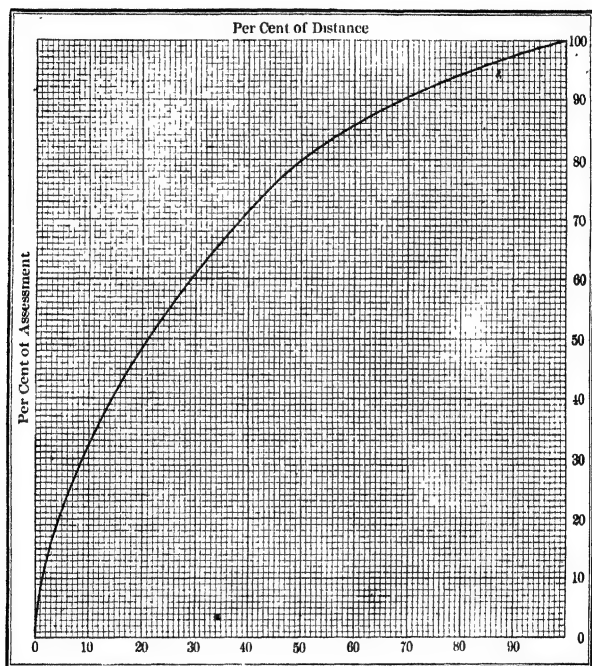


FIG. 62.—Diagram showing a method of grading assessments for benefit according to the distance from the street or park to be acquired.

ance with it will constantly decrease with the distance from the improvement. This decrease should not be directly in proportion to the distance, but in a geometrical ratio. A curve to determine the distribution of the assessment after the limits of the district have been decided has been proposed by Mr. Arthur

S. Tuttle, Deputy Chief Engineer of the Board of Estimate and Apportionment of the City of New York, in accordance with which about 32.5 per cent of the assessment would be placed upon the first 10 per cent of the distance to the outer limit of the area of benefit, 55 per cent upon the first 25 per cent, and 80 per cent upon the district extending half way to the boundary of the assessment area (Fig. 62). This diagram can also be used to determine the extent and boundaries of the area of benefit for properly graduated assessments when the amount of the frontage assessment shall have been decided upon.

In the case of street widenings involving the destruction of buildings, it is suggested that the same general principles be adopted as in the case of new streets, but that they be applied to the land values only. If the street were less than 60 ft. wide, the proportion of expense for the additional land in order to make it 60 ft. would be assessed upon the half block on each side, while for all excess over 60 ft. the same rule already proposed could be adopted. For instance, if a street 50 ft. wide were to be widened to 80 ft., involving the acquisition of 30 ft. of additional property, the first 10 ft. required to make it 60 ft. and 25 per cent of the 20 ft. over 60 ft.—a total of 15 ft., or one-half of the cost of the additional land to be taken—might be assessed locally, the expense involved in damage to buildings being placed upon the secondary area of benefit, or included in the general assessment if the improvement is of sufficient importance to involve general benefit. If the same street were to be widened to 100 ft. the local assessment under the same rule would be for 20 of the 50 ft. to be acquired, or 40 per cent of the total land damage, the damage to buildings, as before, being included in the larger district or general assessment.

It will sometimes happen that a new street to be acquired will include an old road or portions of a narrower street where a number of buildings will be damaged, but where it could not reasonably be treated as a street widening, although the application of the rule first proposed would involve an unduly heavy local assessment. In such cases the following treatment is

suggested: estimate as closely as possible the value of the land to be acquired and make a separate estimate of the building damage; then add to the width of the street a proportion of that width determined by the ratio of the building damage to the land damage, and arrive at an equated width of the street in accordance with which the local, secondary and general benefit can be determined, as already described. If, for instance, a street is to be 80 ft. wide, and if the estimated building damage is 50 per cent that of the estimated land damage, 50 per cent of the width of the street might be added, giving an equated width of 120 ft., and the local assessment might be determined for such a width, in which case it would be 62.5 per cent of the total cost instead of 81.25 per cent, as would have been the case had the rule been applied for an 80-ft. street.

Special cases will undoubtedly arise which would require special treatment, but it is probable that in the great majority of improvements the method proposed would result in an equitable distribution of the burden. Those who are to pay the bills have a right to know in advance how the costs are to be apportioned, and the formulation of a policy which can be consistently followed is not only desirable but necessary.

The problem of determining whether or not there is general benefit and the proportion of the cost representing such benefit will be difficult. The diagrams show what might be an equitable distribution in average cases, but there will be many that will require special treatment, and no rule will fit all of them. Demands are likely to be made for the treatment of streets which will serve a limited district as though they were thoroughfares of metropolitan importance, and these should be consistently denied, however powerful may be the influences behind them.

Where the financial condition of the city will permit, the burdens of the property owner can be considerably lightened by the recognition of deferred benefit and a correspondingly deferred assessment. In this case the city would carry the account until the benefit resulting from the improvement should

have been fully realized, or, in other words, should have been reflected in actual increase in values. Similar relief could be given by permitting the payment of assessments in instalments carrying a moderate rate of interest. Either plan would require larger capital to finance such improvements, and would to that extent impair the city's borrowing capacity for other purposes. These, however, are matters of detail and have to do with the manner of collection of the assessments rather than the distribution of the expense.

The practice of assessing the cost of street or local improvements is probably more general in the United States than in other countries and it is accepted as an equitable and rational plan. A paper read before the Municipal Engineers of the City of New York, in May, 1914, by Mr. William C. Ormond, President of the New York City Board of Assessors, contained an interesting review of the manner in which this policy has been developed, first to a limited extent in England and later and more fully in America.¹

One of the earliest statutes which specifically recognized the theory of assessment according to benefit was enacted, in 1787, by the state legislature of New York, and applied to New York City; it read in part as follows:

And for the better affecting thereof it shall and may be lawful to and for the mayor, aldermen and commonalty of the said city in common council convened, to cause to be made an estimate or estimates, of the expense of conforming to such regulations aforesaid and adjust an equitable assessment thereof among the owners or occupants of all the houses and lots intended to be benefited thereby in proportion as nearly as may be, to the advantage which each may be deemed to acquire respectively. And in order that the same may be safely and impartially performed, said common council shall, from time to time, appoint five sufficient and disinterested freeholders for every such purpose, who, before they enter into the execution of their trust, shall be duly sworn before the said mayor or recorder, to make the said estimate and assessment fairly and impartially according to the best of their skill and judgment; and a certificate in writing of such estimate and assessment being returned to said common

¹ Proceedings of Municipal Engineers of the City of New York for 1914.

council and ratified by them shall be binding and conclusive upon the owners or occupants of such lots so to be assessed respectively; and such owners or occupants respectively shall thereupon become and be liable and be chargeable, and are hereby required to pay such person as shall be authorized by said common council to receive the same, the sum at which such house or lot shall be assessed to be employed and applied for and toward the making, altering, amending, pitching, paving and scouring such streets, and making, constructing and repairing such vaults, drains and sewers aforesaid; and in default of payment thereof or any part thereof it shall be and may be lawful for the mayor, recorder and aldermen of the said city or any five of them of whom the mayor or recorder be one by warrant under their hands and seals, to levy the said sum or sums of money so assessed, by distress and sale of the goods and chattels of the owner or occupant of such house or lot, so assessed, and refusing or neglecting to pay the same; rendering the over-plus, if any there be, after deducting the sum assessed and the charges of distress and sale to such owner or occupant respectively, or their legal representative.

Mr. Ormond refers to a decision of a Kansas court upon the legality of special assessments for benefit, which said:

There is a justice in this arrangement which commends itself to any right-thinking man, but the injustice of assessing property all over a city for the improvement of a single street must be apparent at a glance.

The opinion of a Mississippi judge is also quoted, as follows:

I concede that the system of local assessment is liable to abuse, for which reason courts should scrutinize its application with care and also see that an equitable share of the burden should be borne by the public; but it will be readily foreseen that if the whole local charge for local improvements is to be borne by the city treasury, grievous abuses might be practised upon the inhabitants generally to subserve the local interests of designing men holding property in a particular neighborhood.

The charter of the city of New York provides for the creation of one fund known as the "street improvement fund," from which is paid in the first instance the cost of all physical improvements, such as regulating, grading and curbing of streets, the laying of sidewalks and roadway pavements and the construction of sewers and all works connected with the collection, treatment and disposal of sewage, and another known as the "fund for street and park openings," from which

is paid the cost of acquiring title to all property needed for streets or parks. When the work is completed and the cost ascertained the entire amount is assessed upon the property benefited in proportion to the benefit. While the Board of Estimate and Apportionment is given power in all cases to determine what part of the cost is to be assessed and what part is to be paid by the city, the entire cost is usually assessed, and only in exceptional cases, where the general benefit is obvious or the assessment appears to be more than the actual benefit, does the city assume any part of the cost. The presumption is that both of these funds will be self-sustaining, inasmuch as when assessments are not paid promptly interest at the rate of seven per cent annually is charged as a penalty. The funds, however, occasionally have to be replenished to make good the assessments which fall upon city property, the portion of the cost which is occasionally assumed by the city and such small portions of individual assessments as cannot be collected owing to a provision in the city charter that no assessment can be levied which, in the case of a single improvement, exceeds one-half the fair value of the property. It was formerly the custom to insist upon payment of the entire assessment at once, but since 1912, assessments amounting to a total exceeding five per cent of the value of the property as assessed for purposes of taxation may, upon the application of the owner, be paid in ten annual instalments, all deferred payments carrying five per cent interest.

In other cities the right to assess has been availed of in carrying out extensive city planning or replanning projects. Chicago is making a start on its ambitious plan for the reconstruction of the city. The first street improvement to be undertaken is the widening of Twelfth street from 66 ft. to 108 ft. for a distance of $1\frac{1}{2}$ miles, and to 118 ft. for about half a mile. The cost of the acquisition of the land needed for this widening is estimated to be \$3,000,000, and of this amount one half is to be raised by a bond issue and the remaining half is to be assessed upon the property benefited, the area of assessment covering about 10 square miles. Another important feature of the Chicago plan

is the widening and extension northwardly of Michigan avenue, this widening being from 66 ft. to 130 ft. for a portion of the distance, and to 141 ft. for the remaining distance. A considerable portion of this extension is to have two levels. Buildings will have their entrances on the upper level, while the lower level, corresponding with the present street, will be used for receiving and shipping purposes. The total cost of this improvement is estimated to be nearly \$8,000,000, of which the city at large is to contribute \$3,800,000, while part of the remainder is to be paid by railroad companies which are affected, and a substantial portion is to be assessed for benefit.

There are cases where improvements are carried out on such an extensive scale and the cost of municipal administration is so great that they cannot in justice be imposed entirely or even in large part upon the community. This is likely to be the case in a great capital city. Former President Taft, writing of the special difficulty of financing the improvement of Washington, says:

"While they have to pay but half of the expense of the city government, that half is greater than most cities of Washington's class impose upon their people. There are two reasons for this. The first of these is that no other city of its class has so many unusual expenses to meet. For instance, no other city has so many square feet of street surface to maintain. . . . In every department of its activities its expenses are somewhat unusual, this being due to the fact that the city is the home of the federal government and must meet all the requirements of a National Capital. The second reason why the burden of even one-half of the expenses of the city government is heavier than the expenses of most cities is that Washington has but one industry, which is government, and that industry but one product, which is politics. With no important wealth-producing industries to swell the incomes of the people of the capital, with every activity discouraged that would detract from the beauty of the city, per capita ability to pay taxes is smaller in Washington than in most cities. Hence, it is that even the

half-and-half plan still leaves Washington a rather heavily taxed municipality." Mr. Taft quotes from a report of a committee recommending the adoption of the half-and-half plan the following statement: "There is something revolting to a proper sense of justice in the idea that the United States should hold free from taxation more than half of the area of the Capital City, and should be required to maintain a city upon an unusually expensive scale, from which the ordinary revenues derived from commerce and manufactures are excluded; that in such a case the burden of maintaining the expenses of the Capital City should fall entirely upon the resident population."

There is another method by which the expense of acquiring new streets and parks, or of widening existing streets, or of any other improvement involving the expropriation of land, could be met, at least in part; namely, by the exercise of what is called the right of excess condemnation; that is, by the taking of more land than is needed and the sale of the surplusage after the improvement shall have been carried out and the increase in values due to it shall have been realized. While this power has long been exercised by European cities it has infrequently and reluctantly been granted to those of the United States.

Most of the state constitutions limit the compulsory taking of private property to the precise land needed for a specific public improvement, and constitutional amendments are necessary before this power of excess condemnation can be exercised. Such amendments when made commonly go no further than to permit the state legislatures to authorize by general or special acts any or all of the cities in the state to acquire more land than is needed for a specific purpose. An amendment to the constitution of the State of New York, which was adopted at the general election of 1913, made this instrument read as follows:

"The legislature may authorize cities to take more land and property than is needed for actual construction, in the laying out, widening, extending or relocating parks, public places, highways or streets, provided, however, that the additional

land or property so authorized to be taken shall be no more than sufficient to form suitable building sites abutting on such park, public place, highway or street. After so much of the land or property had been appropriated as is needed therefor, the remainder may be sold or leased."

An amendment previously submitted to the people, which did not contain the restriction as to the amount of land or property which might be taken in excess of that actually needed for construction, was rejected at the general election of 1911.

The fear has frequently been expressed that such a power might be used recklessly or corruptly; and while this may have been the actual reason for some of the opposition, it is quite likely that a large part of it was due to the fact that shrewd real estate operators have in the past derived enormous profits from the timely acquisition of land along the line of a proposed improvement, the receipt of large sums for the portions taken and the great enhancement in the value of the property that remained owing to the beneficial effect of the improvement. The idea of excess condemnation is based, in part, upon a very practical consideration and, in part, upon a theory which is regarded as thoroughly sound in European countries, but which has not yet been generally accepted in America. The practical consideration is that it will avoid the serious mutilation of property by leaving unusable remnants. If these remnants can be taken by the city they can be combined into marketable lots, and the development along the line of the new or widened street will be more rapid and its appearance will be more sightly. It is not uncommon to see narrow strips of property too small to accommodate buildings left along a new street which is an important traffic thoroughfare, and which would be lined with valuable business houses if these strips could be combined and added to adjacent property to furnish proper sites for such buildings. The separately owned remnants are commonly rented for advertising signs or for bootblack, lunch or news-stands, cigar shops or some business that can be carried on in a few square feet of space.

The theory referred to is that of the right of the city to take for itself a part of the unearned increment or the increase in value of property which has been brought about through no act of the owner, but through the growth and development of the city or some public improvement carried out by the city. This idea is gradually making headway in the United States, and it is quite probable that it will soon be generally accepted as equitable and businesslike.

The extent to which shrewd investors are able to profit by city undertakings may be illustrated by a concrete example. In a large city in the United States it became necessary to increase the width of a certain street from 50 to 80 ft., and to accomplish this a strip 30 ft. in width was taken from the property on one side of the street for the entire distance, reducing the depth of the lots on this side from 100 to 70 ft. One particular lot, 20 ft. in width, with an old three-story brick house on it, was bought just before the widening by a man who habitually kept himself well informed concerning contemplated improvements, the price paid being \$11,000. He was awarded \$10,000 as compensation for the destruction of the house and for damage to the lot owing to the decrease in its depth; but so greatly did the widening of the street increase the value of the abutting property that within a few months he sold the remnant, a lot but 70 ft. in depth, with no building on it, for \$12,000, or \$1000 more than the cost to him a few months earlier of the full-depth lot and house, besides having been paid damages to the amount of \$10,000. The city, to finance this improvement, was obliged to borrow the sum of \$2,022,700 for a term of 30 years. The municipal authorities had determined to assess upon the neighboring property one-third of the cost of the improvement, but there were vigorous protests against the injustice of such a procedure, and by a mandatory legislative act the entire cost was thrown back upon the municipal treasury. Had the city possessed the power to acquire the entire row of lots on the side of the street which was to be taken for the widening it might have been able to sell the surplus land, not

at the 100 per cent profit realized by the individual referred to, but for such a sum as would nearly, if not quite, have covered the cost of the undertaking, and would thus have secured the improvement without incurring a large debt for a long term of years.

A resort to the principle of excess condemnation may appear somewhat inconsistent with the policy of assessing in whole or in part the cost of the acquisition of property for new streets, for widening existing streets, for the acquisition of parks, or any other public purpose. That is, it may be argued that if the city is to acquire more land than is needed for a particular improvement it would obviously be unfair to assess upon an area of benefit any part of the expense of acquiring such additional land, or even acquiring the land actually needed for the improvement if entire parcels which include surplus land are to be taken. There is no reason, however, why the principle of assessment should not be combined with that of excess condemnation, and there is no good reason to believe that assessments for improvements of this kind would be increased, while it is quite likely that the burdens would be lightened. If a portion of a lot containing a building falls within the lines of the improvement, and if only the portion required for such improvement were to be taken and paid for, it is probable that the owner would be paid for the complete destruction of the building and for the mutilation of the lot by decreasing its depth or spoiling its shape. If the entire lot were taken it would seem fair and proper to credit the expense of acquiring that portion of the lot needed for the improvement with the salvage, if any there be, on the building, owing to the fact that some of it will be left; in many cases this will represent a very small proportion of the value of the building, but there are cases where it will be considerable. It might also be fair, if the entire lot were taken, to charge up to the improvement only such proportion of the land value as is represented by the part of the lot area falling within the lines of the proposed improvement, thus lightening the burden of assessment by eliminating the element of con-

sequential damage. This might be unfair to the city at large, in view of the fact that the remnant of the lot falling outside of the improvement which the city has to buy is worth less than the proportion of the original lot value determined by the relative area, and an equitable treatment would be somewhere between the two methods of estimating which have been described.

It does not seem necessary to depart from the prevailing method of levying assessments in such cases. The city, having acquired the frontage on the new or widened street, could properly assume the same share of the assessment as would have been imposed upon the remnant of the plot had it remained in private ownership, so that the assessment which would be imposed upon other land within the area of benefit which was left in private ownership would be no greater than would have been the case had no excess of land been taken, but it would actually be decreased by reason of the elimination or, at any rate, by the material decrease in the item of consequential damage.

The amount of additional land to be taken will depend upon the relation of the new or widened street to the plots bordering upon and contiguous to it. In the case of a street widening where the original lots fronted upon the street their depth will be so decreased that, if the new street is to be an important one, it may be desirable to acquire at least one additional lot in the rear in order to provide building plots with a depth suitable for the increased importance of the street. If the lots fronted upon an intersecting street and it seemed desirable to rearrange them so that they would have their frontage on the widened street it would be necessary to acquire two, three or even four additional lots in order to permit advantageous replotting.

The right of excess condemnation when granted should be used with caution and should not be exercised with a speculative purpose. It will increase the first cost of improvements; but if sound business principles govern the procedure the additional expenditure will be recouped within a reasonable time and the final net cost is likely to be very materially reduced.

The London County Council has been following this plan since 1855, and a volume published by the authority of the Council in 1898¹ contains a detailed statement of the first cost and the recoupment in the improvements carried out by that body during the period named. The percentage of the total cost which was recovered by the sale of the surplus land varied greatly. In the cutting through of Garrick street from Long-acre to King street, completed in 1861, it was 72 per cent; in the case of Southwark street, from Blackfriars bridge to High street, completed in 1864, it was 37 per cent; Queen Victoria street, from Blackfriars Bridge to Mansion House, 1871, 53 per cent; widening High street, Kensington, 1869, 33 per cent; widening Tooley street and other connecting streets, including provision for "rehousing 1100 persons of the laboring class," 17 per cent; Shaftesbury avenue from Piccadilly Circus to Broad street, 33 per cent. In the history referred to the Shaftesbury avenue improvement is cited as an instance where a desire to acquire as little property as possible was unfortunate, and the opinion is expressed that it would have been better if the council had not been "imbued with such a strict spirit of economy as that which led it to avoid the acquisition of expensive buildings by adopting an irregular line for the new street, and to sacrifice almost every consideration on the score of cheapness."

One of the London improvements which has frequently been referred to as illustrating how a great public enterprise, involving the expropriation of real estate, might be financed is the so-called Strand-to-Holborn improvement, including the widening of the Strand and Southampton Row and the construction of Aldwych and Kingsway.

From a paper presented by Mr. George W. Humphreys, Chief Engineer of the London County Council, to the Institution of Civil Engineers in 1910, it appears that the total cost of this improvement to March 31, 1910, converted into American money and rounded off, was as follows:

¹"History of London Street Improvements, 1855-1887," by Mr. Percy J. Edwards, Clerk of the Improvement Committee.

Acquisition of property.....	\$27,237,000	
Sundry charges, including rehous- ing and architectural designs.....	944,000	
Construction, including subway and for tramways.....	1,906,000	
Total.....		\$30,087,000

The credits to the account were:

Receipts from sale of land	\$ 1,741,000	
Estimated value of surplus land..	17,588,000	
Total credits.....		19,329,000
Net cost..		\$10,758,000

This statement appears to cover simply the disbursements and receipts on account of capital. It is not improbable that the London County Council has made ground leases for long terms from which it derives substantial annual rentals. If the receipts from that source were capitalized and credited to the capital cost, the amount might be considerably further reduced. Taking the above table as it stands, however, it will be noted that of the total credits nine per cent consists of cash receipts and 91 per cent of the value of surplus land, while of the gross capital cost, 5.8 per cent has already been recouped and 58.5 per cent is represented by the estimated value of surplus land, the remaining 35.7 per cent representing what the people of London are paying for this improvement. That it was greatly needed is beyond question, and that it is worth the price cannot be doubted; but references to it as an enterprise which produced a direct financial return have been very misleading.

In but a single instance does the London County Council appear to have made an actual financial profit from an enterprise involving the taking of land, and that was in the case of Northumberland avenue, which was cut through from Trafalgar square to the Thames embankment. Northumberland House

and its extensive grounds were taken in this improvement, but there were no valuable trade interests to be acquired and paid for, while the surplus property abutting on the new street was so advantageously located that there was an immediate demand for it and it was sold at such generous prices that the receipts from the sales exceeded by nearly 120,000 pounds sterling the entire cost of the acquisition and improvement of the street, including the building of pipe subways, so that there was an actual profit of 17 per cent from the undertaking. This affords an illustration of an unearned increment which the city took for itself. The great increase in value certainly was not due to any act of the former owners of the property, but to an important improvement, initiated and carried out by the municipal authorities, the benefit from which was very promptly reflected in a great increase in the land values. That in many of the improvements carried out by the London County Council in which the right of excess condemnation was exercised the recoupment from the sale of the surplus property was a relatively small percentage of the cost, was due in large degree to the fact that the land required was formerly devoted, not to ducal palaces, but to tenements, and that the "Housing of the Working Classes Act" required the authorities to provide homes for the working people who might be dispossessed, the expense of doing so being a part of the cost of the improvement.

Many of the German cities have bought large quantities of land, in many cases, no doubt, in connection with the carrying out of specific street improvements, but their purchases have been so extensive and their main purpose has been so different that it will be considered in the chapter on Municipal Land Policies.

The manner in which irregular parcels are taken over, replotted and reassigned is, however, so intimately connected with city planning, more especially in its financial aspects, that it will be briefly described in this connection. The plan is said to have been devised by Dr. Adickes of Frankfort, and the law governing it is known as the "Lex Adickes." Under its

provisions, where existing property lines are so inconsistent with those of a rational street plan that the parcels left after laying out a street system cannot be profitably used, the city may, if one half of the owners, who also own not less than half of the land in such a tract, give their consent, take over the entire tract, lay out a proper street system with such open spaces as may be thought necessary, taking out for streets and open spaces as much as 40 per cent of the entire area, and redistributing the remaining land among the owners in such a manner as to give usable plots of an area corresponding with their original holdings less their proportion of the space taken for public use, for which no payment is made. The success of such a policy will, of course, be dependent upon the equity of the redistribution. While this must be done somewhat arbitrarily it is probably done fairly. In most cases the owner of each parcel taken will naturally hope to obtain an advantageous location in the reallocation. Some of them must be disappointed; but that the plan has been successfully followed in German cities is evidence that substantial justice is done, while the great advantage to the city at large in securing a better street plan and increasing the value of the remaining property is quite obvious.

An instance of an attempt to make reallocations somewhat in this manner is noted by Mr. C. M. Burton in his pamphlet on "The Building of Detroit." After a fire which nearly destroyed this town in 1805, an act of Congress authorized the laying out of a new town to include the site of the old one and 10,000 acres adjacent. "As all the lot owners in the former village," says Mr. Burton, "claimed an ownership in certain parts of the town, and as it was impossible to give them their original holdings unless the old town with its narrow streets and small lots was retained, the citizens concluded to lay out a new town and give lands free to the old lot owners in exchange for their former possessions. The judges were to adjust claims for these lots. Every person over 17 years of age who was in Detroit at the time of the fire was to have a lot in the new town containing

5000 sq. ft. The lands which remained were to be sold and the proceeds used for building a court-house and jail." In response to an inquiry as to whether this plan was ever carried out, Mr. Burton says that while proceedings for the distribution were commenced soon after the act was passed, and attempts have frequently been made since to have the Common Council perform the duties imposed upon the "Governor and Judges" acting as a land board under the act of 1806, nothing has been accomplished.

CHAPTER XX

MUNICIPAL LAND POLICIES

WHILE some cities may have adopted certain policies with respect to the control and ownership of land within the city limits and outside of its boundaries for the express purpose of providing funds for carrying out city planning projects or for other municipal activities, the land policies now to be considered are those which have for their chief purpose the control of the price of land, the prevention of land speculation and, as a result of such control, the reduction of rents. In other words, the purpose is chiefly social, or it relates to the social aspects of city planning. The cities of Continental Europe, especially those of Germany, have gone so much further in the control of land prices through restrictive regulation and investment in land by the cities themselves that instances of results accomplished through the adoption of such policies must be drawn chiefly from the cities of those countries, although note will be made of the active propaganda looking to the adoption of these policies and of the arguments advanced in their favor in the English-speaking countries.

In the United States, and to a less extent in Great Britain, there is a strong feeling that the city should not be an owner of real estate other than that needed for public purposes and that investment in land with a view to a profit from its resale or to controlling land prices is not a public purpose. In Germany, on the other hand, such investments are believed to be a perfectly legitimate municipal function. At least they are held to be legitimate and wise by the municipal authorities; but even in Germany, where there seems to be a disposition to submit to regulations and policies imposed upon the people by

municipal officers who have so firmly established their reputations for honest and efficient administration in all other governmental details, there are protests against the severity of some of the regulations affecting the use of land, and attempts of the state and municipal authorities to control or keep down real-estate values. There is a "Protective League of Land and Home Owners" with headquarters in Berlin and branches or affiliated organizations in other cities which opposes some of these policies or what are considered extreme, arbitrary and unwarranted applications of some which are believed to be fair and wise if reasonably and conservatively enforced.

Mr. Frederic C. Howe, in his book on "European Cities at Work," outlines an official statement of the city of Düsseldorf in support of its land policies. It is argued that experience has frequently shown that a tract of land needed for some public purpose is often much dearer at the time it is acquired than it was when the need of its ultimate acquisition for such purpose was first apparent. The city should not, however, limit its acquisition of land to its own immediate needs. It is entirely reasonable and proper that the city should participate in the rise in the prices of land brought about through the establishment of some municipal institution or the carrying out of some improvement that results in an increase of the value of land in its vicinity. The city should especially become the owner of land in the suburban sections and thus influence their development, the mode of building and the creation of larger open spaces, and should promote also the opening up of land for building purposes and thus keep down the prices of land within reasonable limits. The increase in the value of municipal lands is, according to the experience of Düsseldorf, on an average for a long term of years, not less than 4 per cent. annually. Even though stagnation in the rise of prices does set in at times it is claimed that 4 per cent interest will be realized and that they may even figure upon 4 per cent with compound interest. While an investment at 4 per cent doubles itself in 17 years, Düsseldorf has found that ground values

treble and quadruple during the same period, and in some cases increase even more rapidly.

Mr. A. Augustin Rey urges that, in order to secure good living conditions, cities should reserve large open spaces and keep down the price of land, and to attain this end the municipal authorities must "jealously keep all the sites in their possession and never sell any of them. Those which have cost little and are not intended for laying out as parks and public gardens should be let on long leases and at low rents in order to facilitate the erection of dwellings surrounded by open spaces in which the great working class may live at moderate rents. They should seize every opportunity which arises to increase their property by purchasing, according to circumstances and at a moderate price, large areas of land. Municipal authorities should not, however, unless in very exceptional cases, themselves erect dwelling houses."¹ He refers to the striking example set by the city of Ulm, where the purchase of extensive areas by the city has enabled it to prevent a rise in the price of land, while the dwellings have few stories and are surrounded by wide open spaces and, as a result, the healthfulness of the city is notable.

Düsseldorf, as a result of its policy, is the owner of land equal in area to 17 per cent that of the entire city in addition to its liberal park reservations and the space occupied by its streets. While some of this land has doubtless been acquired for the purpose of carrying out projected improvements, a large part of it is held as an investment and for the purpose of controlling development and discouraging speculation. Berlin is a large investor in land, its holdings being about three times the area of the city, by far the greater portion of which is obviously outside the city limits. Strassburg is a large landowner, its holdings being said to amount to several times the area of the city, while Frankfort owns an area nearly one-half, Hamburg one-third, Cologne 18 per cent and Hanover 11 per cent of the areas within the limits of the respective cities. Mr.

¹ Proceedings of London Town Planning Conference, 1910, p. 274.

Frank Koester states that the city of Ulm actually owns 80 per cent of the land in the city and its immediate suburbs. He says that the city's real estate speculation began when the old fortifications were sold to the municipality and the area formerly occupied by them was used in developing a comprehensive city planning and housing scheme. This resulted in a prompt advance in the land values outside the zone of the improvement and, while the city had already been buying land, it extended its operations and secured large additional areas in order that the city itself should profit by the results of its own undertaking rather than allow the former owners to be enriched through no act of their own. It is said that in 1909 the municipality, then a city of but 56,000 population, had acquired more than 1200 acres representing an investment of about \$1,400,000, while some 400 acres had been sold for about \$1,625,000, the city still having about 800 acres besides a cash profit of \$225,000. Meanwhile other land in large amounts had been purchased in the old parts of the town. Not only is Ulm a large land-owner, but it improves its holdings by building and selling on the most liberal terms, ten per cent cash and the balance at very low rates of interest, and with the understanding that the city may take back the property at the original purchase price in case the owner is unable to pay the interest. With this control of the nature of the development there is perhaps a better guaranty of permanence of the character of a neighborhood than is to be found in any other city.

Mr. Frank B. Williams, in a report made to the Heights of Buildings Commission of New York City, gives some interesting information concerning the results of the regulations and land policies of the German cities, which were obtained by him in the course of an investigation made for the Commission. In Frankfort he found that regulation did not keep land prices down. Many of the streets are claimed to be wider than necessary and the abutting property had to pay for them; the city is said to have bought land too extensively, thus lessening the supply, the city owning a third of the possible building

land within its limits and a few large financial institutions and wealthy persons another third, while it is also alleged that the city paid too high prices for what it bought. Owing to the high land values and the restrictions upon its use, building had practically ceased in 1910. In the central part of the town, where the restrictions were less rigid, the land was all built upon, and in the outer districts, where limitation of height and area which might be occupied were more severe, rentable space was so reduced that buildings were not profitable at rents the tenants were able to pay. To meet this situation the restrictions in the outer zone were somewhat lessened in 1910, but financial conditions were such that there was little, if any, resumption of building.

One of the objects which the German cities seek to attain by their land policies is the prevention of "wild building" or the scattered improvements which make the approaches to the average American city so ragged and irregular. German cities extend from the center outward in solid blocks, each block being almost entirely built up before building is commenced upon the next block beyond. One of the purposes of this policy is to keep down the cost of construction, repairs, cleaning, lighting and policing. In many cities this is effectively accomplished by prohibiting the erection of any building until the street upon which it abuts has been completely paved, while no street may be paved unless the roadway and sidewalk pavement connect with a street already completely improved. It follows that no individual can erect a single building on an unimproved street unless he shall first pave or pay for the pavement of the entire block, and then only if the block connects with a street already paved; that is, he must, if he wishes to build in advance of his neighboring land-owners, pay for the pavement in front of their property as well as for that in front of his own. The city secures his investment in the improvement to the extent that it will collect and pay to him the share of the pavement chargeable to any other owner when he in turn wishes to build, and will not issue a permit until such share shall have been paid.

The result is that little, if any, individual building is possible, but practically all of the land is held and all the building is done, by corporations of sufficient financial resources to permit them to carry out such undertakings on a large scale. If the purpose is to reduce the amount of "building ripe" land to a minimum, such a policy will surely accomplish it.

In order to prevent speculative increases in land values the municipal authorities sometimes resort to methods which in America or Great Britain would be considered arbitrary in the extreme, such as a change in the restrictive ordinances. Mr. Williams cites an interesting case, where, in September, 1912, an ordinance adopted two and a half years before with respect to a part of Charlottenburg, was radically changed. The original regulations permitted the type of improvement prevailing in certain parts of Berlin, allowing five stories in height and the occupation of about 75 per cent of the lot. The amended regulations restricted the buildings which might be erected for a limited portion of the area to those of Class A, where the limit was four stories, with one-half of the lot covered, but for the greater part to Classes C and D, which allow, respectively, buildings of three stories using three-tenths of the lot, and two stories covering the same proportion of the lot. The tract was undeveloped. There were streets about it, but none within its limits, and it contained no buildings except an old castle. The justification which was claimed for this arbitrary action was that the prices that had developed were purely speculative, and a statement attributed to a public official was: "they must take their chances as to the ordinance they will get and they knew it when they bought. We cannot make our rules to fit their prices; let them fit their prices to our rules." To the owner of property in an American city this would seem a very brutal policy. It is followed in Germany, and it has accomplished the results which are believed by some to be so desirable.

Perhaps one of the simplest and most effective ways to prevent speculative increases in land values is the exaction of the unearned increment tax. The right of the city to a part

of the increase in the value of real estate caused by a specific improvement has already been referred to as a justification for the adoption of the policy of excess condemnation in order to meet a part of the cost of such improvements. The unearned increment tax as imposed by the German cities is, however, a revenue producing device and may be considered as a municipal land policy. Mr. Howe says that the first instance of the imposition of such a tax was in 1898, when Germany acquired from China the port of Kiau Chau, and provided that the purchasers of land should pay into the city treasury a tax amounting to 33 per cent of the increased value which came to the land by virtue of the growth of the community. This was so successful, that in 1904, Frankfort adopted the policy, and it was rapidly taken up by other German cities. In Frankfort a transfer tax of two per cent on the selling price of the property is paid whenever it changes hands, irrespective of whether it has increased in value or not. The unearned increment tax proper is imposed both upon the increase in the value of the land which remains in the possession of the same owner, amounting to from one to six per cent of the increase in value, and upon the speculative profit realized from its sale, this last being much higher and ranging from two to 25 per cent, according to the amount of profit and the period within which it is realized. Within three years after this policy was adopted by Frankfort it was introduced by eleven other cities, and so rapidly did the idea spread that by 1910 it is said that 457 German cities and towns had followed Frankfort's example. Of the cities and towns of Prussia which had adopted the plan, 27 were of over 100,000 population, 72 of from 20,000 to 100,000, and 64 of from 5000 to 20,000.

In most American cities nearly all of the taxes are imposed upon real estate. An attempt is usually made to tax personal property, but the difficulty of locating such property makes the attempt almost a farce, and abandonment of the effort is frequently urged. Real property in many cities is assessed for taxation at its full market value, and as these assessments are

constantly increasing with the land values the unearned increment actually is taxed, though not to the degree which prevails in Germany. In Great Britain, on the other hand, land is taxed on the basis of the returns received from it. Large tracts of unimproved land, even in London and other large cities, thus almost entirely escape taxation during the period in which they are becoming more and more valuable owing to the development of the property about them. The injustice of this system is so obvious that insistent demands are now being made for the reform of the British tax laws.

Efforts to induce the provision of houses at low rents have frequently taken the form of agitation for the decrease or even the abolition of taxes on buildings, with the avowed purpose of compelling the improvement of vacant land, thereby insuring a surplus rather than a shortage of dwellings with a reduction in rentals which would naturally follow. To the advocate of the single-tax theory this seems the only sure remedy for many of the ills suffered by city dwellers. It appears, however, to be the first step towards the complete municipalization of the land within the city, which would certainly put an effective stop to land speculation by individuals, and yet the German cities frankly maintain that such land speculation is an entirely proper as well as profitable activity for the city itself. The advocates of this policy maintain that the halving or entire removal of the tax on buildings will stimulate better building and better architecture. If this be the case it would doubtless be due to the fact that the better built and more attractive dwellings and office buildings would secure tenants, rather than to the fact that the owner of the land wishes to provide for tenant or buyer the best that he possibly can. The reduction of, or even exemption from, taxation for a limited period for buildings reaching a definite standard of construction and architecture would probably accomplish this same purpose, and good building might become a habit. The late John M. Carrère, of New York City, urged a few years ago that, in order to encourage a better type of architecture in

apartment houses, one house of this kind, which might be declared by a competent jury of architects to be the best of its type erected within the year, should have attached to it a tablet with a statement to this effect; and, in addition to this, he suggested that the taxes on such a building be remitted for a period of from one to five years. Those who urge the adoption of the single-tax plan, the arguments in favor of which were so forcibly presented by the late Henry George, insist that land, being something which has not been created by personal effort or industry, is not a thing which can properly be held in private possession, and that the person who does happen to own it should, while having the use of it, contribute some of his profit to the people whose presence on and about it has actually created its value, or the increase in value which it has acquired through no act of the owner.

Reference is frequently made to the extraordinary increases which have taken place in the value of real estate in New York City, and yet it is admitted that if the price paid to the Indians in 1626 for the whole of Manhattan Island, which was \$24.60, had been put at compound interest during the time which has elapsed since its purchase it would by now have amounted to a sum not less than the entire assessed value of that land at the present time. Had the people not come to this island in great numbers the land would be worth no more to-day than it was in 1626. Many owners of city property do not realize as great a return upon their original investments as they would had the money been left in a savings bank. It is only through improvements placed upon it that any return at all has been realized; that is, the land itself has simply afforded a site for a business enterprise, the success of which has given that land and other land in the vicinity an apparently greater value. It is this apparent increase in land value that the single-taxers would extinguish by taxation without penalizing the owner by imposing upon him a further tax for his enterprise in erecting useful buildings upon the land, or his public spirit in making such buildings so attractive that they will add

to the beauty of the city. It is urged also that when insanitary tenements and unsightly structures are maintained upon the land the city should have the same right to insist upon their removal without compensation that it now has to condemn and remove a building which is structurally weak and unsafe, or to take away and destroy rotten meat, spoiled fish, impure milk or disease-infected clothing. There are many individual cases in which apparent increases in the prices of land have brought fortunes to those who were lucky enough to acquire it at the right time. The *Single Tax Review* for November-December, 1913, gives a number of such instances, showing how slowly the land values of Manhattan Island advanced when the population was small and how they increased by leaps and bounds as the number of inhabitants began to grow rapidly. It is said that the first private sale of land recorded was in 1643, the year in which lower Broadway was laid out, when a lot on Bridge street between Whitehall and Broad streets was sold for a little over \$9. Broadway was then the fashionable residence street, and a lot below Wall street was sold in 1726 to a blacksmith for \$250. By 1770 lots in this neighborhood had increased in value to nearly \$2000. In 1790, a lot at Broadway and Battery place with what was then considered a fine house was worth \$10,000; another, fronting on Bowling Green, the home of one of the most distinguished citizens, had the same value; another a few doors above was worth \$7000. The residence of Mayor Varick at the corner of Pine street was worth \$15,000, while a little below Wall street stood the most palatial residence of its day, which was valued, both land and improvements, at \$17,000. In 1794 the land on which the *World Building* now stands was sold for \$1800; the land alone is now assessed for purposes of taxation at \$1,500,000. Broadway then ended at Chambers street, where the Lispenard farm began. Just after it was extended through this farm a small lot near the corner of Duane street was bought for \$250 and 10 years later was sold for \$1975. In 1818 this same lot was mortgaged for \$7000 and was sold on foreclosure for \$8600, again changed

hands in 1825 for \$9000, while its last transfer, which took place in 1898, was for a consideration of \$200,000, representing an increase of 2100 per cent in 73 years.

The slow growth of land values during the century following the transfer from Dutch to English rule is explained by the small increase in population. When that change took place in 1674, there were only about 3000 persons in the town; there was an increase of but 400 in the next three years and about 1000 in the following 25 years, and in 1771 it had become a city of only 21,683. From then on its growth was steady and rapid. In the last decade of the eighteenth century the population doubled, going from 30,000 to 60,000, while in the first decade of the nineteenth century it rose to 95,000. In 1845 the city had 371,223 inhabitants, which number was increased to 515,394 in 1850, a growth of nearly 40 per cent in five years. This increase in population was accompanied by an extraordinary increase in land values. In 1820 one thousand building lots between Fourth and Seventh avenues were sold for \$4000 or at the rate of \$4 a lot, while in 1852 they were sold for \$780 a lot. A single lot on Fifth avenue in this same district, having an area of 2210 sq. ft., was sold in 1908 for \$250,000, or \$113.12 a sq. ft., while a corner plot at Fifth avenue and Fifty-sixth street, 50 by 100 ft. in size, brought \$725,000 or \$145 a sq. ft. The old Fifth Avenue Hotel property fronting on Broadway and Fifth avenue between Twenty-third and Twenty-fourth streets was sold a few years ago for \$7,250,000, while 60 years before it was valued at \$2000. The increases in the values of down-town property during this period were still more striking. A lot at the corner of Broadway and Dey street, which in 1745 was sold for less than \$200, brought \$1,000,000 in 1906. The land on which the Equitable Building now stands, which is valued at about \$12,000,000, was sold in 1721 for a little less than \$300. There has been one sale in the Wall street district at the rate of \$558.65 and one at the rate of \$655 a sq. ft.

Some of the investments in land on Manhattan Island which are now seen to have been very profitable were not considered

evidence of particular shrewdness by the investors' neighbors at the time. As late as 1826, when John Jacob Astor bought the Thompson farm lying on both sides of Fifth avenue from Thirty-second to Thirty-fifth streets for \$25,000, it was thought by some to be a foolish investment, as the land was not even considered good pasture. In 1908 a single lot in this tract was sold for \$400,000, and the land on which stands the Waldorf-Astoria Hotel has an assessed value, exclusive of the building, of \$9,260,000. When Captain Randall made his will in 1801, and left a farm of 21 acres at Broadway and Astor place, the income of which was to be devoted to the support of a home for old sailors, no one imagined that the Sailors' Snug Harbor would, before the end of that century, receive an income of more than \$300,000 a year from ground leases for the land comprised in that farm. The old Stewart store, now a part of the Wanamaker establishment, is on a portion of the tract, and its assessed value for land alone is \$1,765,000.

The statement in the article in the *Single Tax Review*, from which most of the preceding data have been taken, that the land has value only because of the presence of people on it, is obviously true. The buildings which may be erected on it are mere incidents and they soon give place to others more capable of earning an income which will pay the interest on the land investment. After commenting upon the fact that few of the old buildings remain, the article closes with the following:

But the island remains, the earth and rocks, the geologic formation, plus population: and the revenues of the great land-owners remain as long as these remain. Houses, mercantile palaces, and stately office buildings come and go; but a little earth and rock and sand fronting the harbor remain as a very permanent investment, which increases constantly in value as the human tide flows in.

Many instances of rapid increases in land values in other American cities might be given, some of them even more extraordinary during "boom" periods, and in many cases there has been a recession in values. While the values in New York are greater than in any of the others, the advance has been steady

and has been maintained. They are greatest on Manhattan Island owing to the limited amount of land and the shape of the island, the greatest values being at the southerly end, where the financial and office districts and the administrative center of the city are located. But the values in the other four boroughs are also increasing and will continue to increase in the aggregate, but they will be better distributed as the great rapid-transit system now being constructed is available for use, and there is likely to be a recession of values in some districts. The steady growth in the assessed values of real estate in the five boroughs and the greater city during the 14 years from 1899 to 1913 is shown in Table XII, which has been compiled from the reports of the Department of Taxes.

The values given in the table include both land and buildings, and it will be seen that while there has been an increase in the total values every year it has been slight in some years and very marked in others. In 1903 there was an increase of 43 per cent over the values of 1902, which was due to a consistent effort to assess all property at its full value as required by law, coupled with a desire to increase the borrowing capacity of the city in order to carry out some extensive improvements, the bonded debt of the city for enterprises which are not self-sustaining being limited to ten per cent of the assessed value of the real estate. The land values of New York have been discussed at some length, not because they illustrate the working of a municipal land policy, but as affording an excellent example of the results of a lack of such a policy. Are the increases which have taken place unnatural and unwholesome? Are fortunes made through far-sighted investments in land in a growing city ill-gotten? Should the state or the city take for itself a considerable portion of these increased values and thus keep within reasonable limits the fortunes which may be amassed by shrewd or lucky investors and their descendants? Should the city, by judicious purchases of land in advance of development, and its improvement or re-sale at moderate prices and subject to restrictions which will prevent its too intensive use, effectually

TABLE XII

SHOWING THE INCREASE IN THE ASSESSED VALUES OF REAL ESTATE IN THE
FIVE BOROUGHES OF THE CITY OF NEW YORK, FROM 1899 TO 1913

YEAR.	MANHATTAN.	BROOKLYN.	THE BRONX.
1899	\$2,054,903,875	\$ 609,822,267	\$123,702,030
1900	2,231,502,655	651,408,500	138,494,849
1901	2,285,188,713	658,962,119	143,808,303
1902	2,358,939,618	670,533,508	153,500,568
1903	3,483,793,382	853,760,357	247,090,767
1904	3,676,857,411	901,994,957	261,026,477
1905	3,820,754,181	940,982,302	274,859,593
1906	4,105,352,281	1,072,007,172	355,779,602
1907	4,391,970,951	1,181,221,910	396,687,730
1908	4,584,536,431	1,334,864,835	441,228,718
1909	4,614,446,286	1,354,809,840	462,704,008
1910	4,743,916,785	1,404,036,521	493,757,919
1911	5,037,872,685	1,689,171,283	605,222,933
1912	5,035,485,413	1,674,742,409	616,521,378
1913	5,126,942,595	1,680,013,591	640,340,593

YEAR.	QUEENS.	RICHMOND	ENTIRE CITY.
1899	\$103,752,600	\$40,264,692	\$2,932,445,464
1900	104,427,772	42,723,924	3,168,557,700
1901	107,179,620	42,639,506	3,242,778,261
1902	108,859,704	38,814,181	3,330,647,579
1903	123,781,723	43,124,597	4,751,550,826
1904	131,379,225	44,205,709	5,015,463,779
1905	140,404,990	44,581,235	5,221,582,301
1906	159,446,205	45,901,985	5,738,487,245
1907	217,668,775	52,931,236	6,240,480,602
1908	296,458,980	65,326,825	6,722,415,789
1909	308,112,605	67,106,965	6,807,179,704
1910	334,563,960	67,917,489	7,044,192,674
1911	446,569,352	80,003,911	7,858,840,164
1912	456,750,539	78,399,151	7,861,898,890
1913	477,792,836	81,558,246	8,006,647,861

PERCENTAGE OF INCREASE DURING FOURTEEN YEARS

	PER CENT.
Manhattan	192
Brooklyn	176
The Bronx	530
Queens	361
Richmond	103
Entire City	207

put a stop to such great increases in value and the heavy tax upon business which these values involve? The German cities evidently believe that it should, and there seems to be a general belief among writers on city planning that the German cities are models for the rest of the world. Yet there is, as already noted, a suspicion in many of them that they have gone too far in this direction. Somewhere between the extremes represented by New York on the one hand and the German city on the other there is doubtless a happy mean which will give sufficient opportunity for private enterprise and yet will insure to the city, or to all the people of the city, a share in the values created by their presence and their labor.

CHAPTER XXI

THE OPPORTUNITIES AND RESPONSIBILITIES OF THE MUNICIPAL ENGINEER

IN the preceding chapters an attempt has been made to indicate what a city plan is, how it is developed, the various problems which must be studied and the conditions which it is necessary to provide for or guard against. The unfortunate results of mistakes in the original plan have been pointed out and the difficulty and expense of subsequent corrections have been noted. Who is primarily responsible for these mistakes? Perhaps it is unfair to call them mistakes, if the word be taken to mean blunders due to lack of ordinary foresight or to carelessness. The recent growth of cities and the changed conditions which have made possible the concentration of such numbers as are now found in our large towns, could not have been foreseen by those who laid the foundations for what are now our largest cities; but many new cities have lately been established and small towns are rapidly developing into large cities. According to the United States census of 1910, 34 towns which had a population of 25,000 or more in 1900 had increased more than 50 per cent during the preceding decade. Of these 21 had more than 50,000 population in 1900, and of these 21 eight showed increases of from 50 per cent to 75 per cent, five from 75 per cent to 100 per cent, and eight of more than 100 per cent, one of them, Birmingham, Alabama, having added 245 per cent to its population. Nine of the 34 cities had from 50,000 to 100,000 population in 1900, and of these five showed increases of from 50 to 75 per cent, while the remaining four increased more rapidly, the increase in one of them, Seattle, being 173 per cent. Even more remarkable, perhaps, is the fact that

four towns of over 100,000 in 1900 increased more than 50 per cent in population during the ten succeeding years; one of them, 52 per cent; another, 63 per cent; a third, 70 per cent, and the fourth, Los Angeles, showed the extraordinary increase of 211 per cent. It will be seen that since the defects in the plans of older towns and their inadaptability to new conditions have become apparent there have been examples of extraordinary and even sensational growth of cities, which has emphasized the need of more far-sighted planning, and the excuse that it is impossible to foresee such growth, which excuse was not unreasonable in the case of some of our older cities, can no longer be given much consideration.

It is significant that quite a number of the 34 cities in the United States which increased 50 per cent or more in population during the first decade of the present century have undertaken or are talking about replanning. This indicates that even when their rapid growth began they had failed to realize what was coming or to take account of changed and changing conditions. To repeat our question, who is primarily responsible for these mistakes? It must be admitted that they are to a great extent chargeable to the engineer, although they are probably due in many instances to lack of power on the part of the municipal authorities to control the plotting and development by private individuals and land companies, of tracts within or contiguous to the city limits and which have been absorbed by its rapid growth. The engineer will be the first man on the ground; he will make the first topographic surveys; his work will influence, if it will not control, the lines of transportation and the adequacy of terminal facilities; he will fix the lines and grades of the streets which are to become the traffic arteries of the town and which will make it easy or difficult for it to develop into a great city; he will decide upon the general arrangement of the streets and blocks upon which will depend the possibility of effective architectural treatment; he will either afford an opportunity to others to propose and carry out so-called city planning projects at great cost in order

to correct defects in his plan or he will, by the exercise of vision and disciplined imagination, lay down the lines along which the town can develop without costly reconstruction.

Who is making the most substantial contribution toward the orderly development and administration of our cities? It will be admitted that the engineer is constantly assuming a position of greater importance in the physical, industrial and commercial development of all countries, but nowhere have his services been in greater demand than in the construction and operation of cities. Where towns formerly delegated the investigation and even the execution of important improvements to committees of boards of aldermen, who might have thought it necessary to employ a party of surveyors or even one or two men who were recognized as engineers, there are now organizations of technically trained men, some of them acknowledged experts in their particular line, to whom are left both the final decision as to the plans for important projects and complete responsibility for their execution. The variety of subjects with which the City Engineer of a town of several hundred thousand population is expected to be familiar is quite bewildering. All questions relating to street and road improvement, including the various kinds of pavement and their adaptability to different conditions; the design and construction of sewers and the various methods of sewage treatment and disposal; the water supply, its development, protection, treatment where necessary, and its distribution, including the construction and operation of pumping plants; the collection and disposal of wastes by the most effective and economical methods and in the least offensive manner; the lighting of streets and buildings, whether by contract with public-service corporations or by municipal plants, together with the production and distribution of electric current or other sources of power and heat, such as compressed air and steam; the construction and maintenance of street railway tracks, the type of rail and the kind of pavement best suited thereto; problems of traffic regulation and control: building regulations, including not only the code

governing methods of construction, but restrictions as to height and arrangement—with respect to all of these and more the municipal engineer is expected to be able to advise and frequently design and execute.

But a new field of activity has lately been presented to him, that of administration or management. In selecting a business manager it is the custom to choose one who has had extensive experience with the kind of business he is expected to manage. Municipal business consists to a very large extent in the operation of engineering enterprises, the plans for which were designed and carried out by engineers. It is quite natural, therefore, that in the selection of a manager for city business the municipal engineer should be considered the most available. The City Manager plan of administration, described in the chapter on City Planning Legislation, has gained great headway, and new cities, towns and villages are each month being added to the list of those which have adopted it. In its issue for June, 1915, the *American City* gave some statistics concerning the towns which had adopted this plan. They vary in size from villages to cities of more than 100,000 population, but none of the larger cities appears to have tried the experiment. Of 30 towns the title of "City Manager" was selected by 19, that of "General Manager" by three, "Business Manager" and "Town Manager" by two each, while titles of "Manager of Operation," "City Engineer and Manager," "Managing Engineer" and "Village Manager" each were taken by one town. But of more significance than the title selected is the kind of man chosen to fill the place or at least the sort of experience which was supposed to qualify him for the job. If the statistics of the *American City* are correctly understood, eleven of the 30 managers appointed were civil engineers holding professional degrees and with experience in municipal work; four were engineers of demonstrated capacity, though not holding professional degrees; two had been engaged in public utility management, while in one instance each the previous experience of the man selected had been Superintendent of Sewers, Superintendent of Water-

works, Business with Engineering Experience, Business Management, Contracting, Real Estate, Alderman, Business and Politics, Law and Politics, Teaching, Insurance and Politics, while in one case it was not stated. It seems that municipal engineers, who have been conspicuously backward in grasping new opportunities, are having forced upon them duties for which their training especially qualifies them. The City Manager plan has been adopted to such an extent that a City Managers' Convention was held late in 1915, at Dayton, Ohio, at which Mr. H. M. Waite, the City Manager of the Convention city, made some concise and forceful statements regarding the powers and duties of the City Manager, among which were the following:

Men of large affairs demand broad authority. Broad lines of authority develop and attract capable executives. Broad authority carries responsibility. Responsibility attracts executives and imposes on them caution. Executives with broad authority, and using caution, accomplish results. Communities that, for any reason, cannot give broad authority to the executive, are not ready for the ideal and should accept a more modified centralized authority and not call it a city-manager form. The executive of the ideal government should have full authority in the administration of government and be held responsible for it. Lack of authority permits excuses and explanations, but clean-cut authority gets clean-cut men and clean-cut results. To get the maximum power and efficiency from the city manager he must be given the maximum authority.

Reference has been made to surveyors who may have been employed in the establishment of a town or in the earlier period of its development, and a distinction is drawn between surveyors and engineers. While such a distinction was intentional and is warranted in the United States, it might be misunderstood in Great Britain. The head of the engineering department of the British city is frequently called the City Surveyor, as the head of the engineering department of the state of New York is called the State Engineer and Surveyor. In both these cases an old title has persisted, although it does not properly indicate the nature and the duties of the office. The term "Surveyor" appears so often in the British Town Planning Act and in the

town planning and engineering literature of that country. that Mr. Thomas Adams, formerly Town Planning Expert of the Local Government Board and now Town Planning Adviser to the Canadian Commission of Conservation, was requested to indicate just what the functions of this officer are. He has done so in the following words:

The surveyor is the professional man who deals with all questions connected with real estate and its development for all purposes. He is also an expert in land valuation and in questions relating to the assessments of property. These men have to pass examinations which include many architectural and engineering questions, as in developing land they have to deal with sewerage, water supply and many intricate problems of land tenure. I believe that a surveyor of this kind does not exist in America, although to a certain extent the land surveyor of Canada performs part of the duties of the British surveyor. The surveyor is thus a sort of combination of a Canadian land surveyor, municipal engineer and real estate developer. He is a very useful professional man in England and gives a status to the management and development of real estate which is badly needed over here. Such a person can bring special expert knowledge to bear on town planning. In regard to convenience, for instance, he has to deal with the problem of land values and subdivisions as they are affected by the highways, transportation, and planning of factory areas. The same points arise in connection with fixing open spaces and height and character of buildings under the heading of amenity. Finally, he is probably the most important man in connection with the ascertaining of costs and adjusting the cost of developing land to character of buildings.

The municipal engineer needs the peculiar information and experience of the British surveyor if he is successfully to cope with the problems which are now being forced upon him. It seems odd that men who have been so closely identified with the development of cities and with the administration of their affairs should have manifested so little interest in and should have been so slow to realize their responsibility for the general plan upon which these cities have been started and along which they will grow. They have thought much of the problems of construction and operation, but little of the appearance of the town, and their contributions to its adornment and beautification have been small.

Mr. K. verstraete, Ingenieur principal des Ponts et Chaussées of Bruges, in a paper presented at the International Road Congress held in London in 1913, says:

Throughout all ages mankind has done its utmost for the embellishment of cities. Little appears to have been written upon this subject and most of this is of recent date and is the work of art enthusiasts. Engineers appear to take little interest in the subject, and, if their apparent indifference continues much longer, they will find that this natural branch of their profession will pass into other hands, which would be much to be regretted. The dominating desire for the picturesque, for variety and for originality, which ever guides the art enthusiast, will never lead to a natural solution of a problem such as is the outcome of utility linked with good taste.¹

As pointed out in an early chapter, the keenest interest in what we call city planning has heretofore been shown by architects, landscape architects, artists, students of civic affairs, social workers, etc., while engineers appear to have been content to carry out the physical work of city building along lines already laid down, or, when called upon to make plans for future development, to adopt the conventional features followed by their predecessors. Engineers engaged in this particular class of municipal work have so long been accustomed to doing things when they are told, as they are told and because they are told by those whose function they have thought it to be to determine general plans and policies that they are to a large degree responsible for the idea so generally prevailing that the duty of the engineer engaged in municipal work is simply to carry out the ideas and policies of others. Who does, who must do and who should do the fundamental work of planning out cities? It is not the work of the architect, as, however important may be his function in making a city dignified and beautiful, the general plan will have been made before he appears on the scene and it should be such as to afford suitable sites for his great buildings without rearranging the street system. It is not the work of the landscape architect, although the plan should be such as to permit effective work by him in

¹ Third International Road Congress, London, 1913, Paper No. 3.

the treatment of parks and boulevards and in the selection of the areas and the streets to be so treated. It is not the work of the sculptor, but the general plan should afford suitable sites for the fountains, monuments and statues which he will be called upon to design. The engineer as the first man on the ground has a rare opportunity and a grave responsibility. The task calls for vision and imagination, and these are qualities the exercise of which on the part of the engineer has often been thought rather dangerous; and yet the engineer lays the foundations upon which our cities are built. He has been too prone to regard this preliminary work as a mere matter of surveying; more or less precise surveying, it may be, but he has been more intent upon the accuracy of his measurement of lines and angles and of his computation of areas than upon the larger problem of providing for the orderly and sightly development of the city. His eyes have been so closely fixed upon the drawing board that he has seldom looked up to catch a vision of the great city that is to come—the complex organism known as the modern city with its varied activities, its difficult social problems, its ugliness or its beauty, its awkwardness or its convenience, its capacity to debase or to elevate its citizens. Every blunder that he makes will afford an opportunity for some one else to win applause for a plan to correct it through large expenditure of public funds. It often seems as if the admiration excited by what are commonly called city planning projects are in direct proportion to the amount of destruction of existing improvements and the extent of the disarrangement of the existing plan which may be involved. If you are going to dream, we are told, dream a big dream and the people will look and admire; but these big dreams appear always to involve the spectacular making over of a big city and rarely the planning of a city not yet come into being or even of a city which is just beginning to give promise of rapid growth, although still in a formative state. Planning of this latter kind will not bring applause; genius devoted to such work will not win prompt recognition. The merits of such a constructive plan may not be appreciated during the

lifetime of the man responsible for it. L'Enfant died many years before his plan for Washington was realized to be anything more than a fanciful sketch.

The idea seems to be quite prevalent that city planning for any particular town is something that may be taken up whenever sufficient popular interest has been aroused and pursued with enthusiasm until, with the aid of special expert advice, a definite plan shall have been evolved which will probably necessitate considerable rearrangement, and that the town will then have been started on the right road for its future development. It is quite probable that if, a year or so later, a new set of experts were to be called in and a new diagnosis were to be made, an entirely different remedy would be prescribed which would in turn be discarded by a later set of experts. A good city plan for a well-established town that wants to correct some of its old defects and properly control its future growth has rarely, if ever, been produced as a sudden inspiration, nor has it been the result of a few weeks or months of study by a man or a group of men unfamiliar with the traditions, the habits and the peculiar needs of the people, and yet that is the usual method of procedure. Commissions have been created, experts have been retained and acres of plans in the form of cleverly drawn pictures have been made, exhibited and admired until some one has asked how much it is all going to cost and how the funds are to be raised. It is astonishing to what an extent this simple question tends to dampen enthusiasm. It may be that some of the projects recommended would be cheap at any price, but such an answer will not convince the taxpayer. He must be shown just how and why they will be of advantage to the city and to him as a citizen.

The creation of a proper plan will require years of patient work, and the men who do it will be forgotten before it is finally carried out. It is no one-man job and it is never actually finished. However carefully and skilfully the first plan may have been made, unforeseen changes will take place, new methods of transportation will be developed, new inventions will power-

fully affect the social life of the community, and the plan, where still susceptible of change, must be modified to meet these changed conditions. Comprehensive city planning can best be done by the regularly employed technical staff of the city, but the organization created for this purpose should be carefully selected. It should contain men who are familiar with the past history and traditions of the community and are in sympathy with them, but who can appreciate changing conditions and adapt the old to the new without destroying it. The work should be directed by men who do not think the exercise of imagination an engineering crime; men who are enthusiasts without being doctrinaires; men who are content to do their work well without hope of popular applause and who are willing to await the verdict as to their work which will be rendered by coming generations.

Is it not obvious that municipal engineers not only are primarily responsible for the lines along which our great cities will begin to grow and for the readiness with which our small cities may develop into large ones, but that they have an opportunity to direct along sane and rational lines a movement to make our cities convenient and beautiful as well as orderly and healthy? The chief purpose of the author in undertaking the preparation of this volume has been to bring home to them this responsibility and awaken in them a realization of this opportunity.

SOURCES OF INFORMATION

While city building is as old as civilization and much has been written upon the subject, particularly upon the cities of ancient and medieval times, the literature of city planning in the sense in which it has been considered in this volume is of recent growth and no attempt has yet been made to prepare a complete bibliography of the subject. An excellent foundation for such an undertaking has been laid by Professor James Sturgis Pray and Miss Theodora Kimball of the School of Landscape Architecture of Harvard University in their system of classification, which has been prepared with great care and thoroughness.

An admirable summary of "Town Planning Literature" by Professor Patrick Abercrombie, in the form of a paper read before the British Town

Planning Institute, and which was published in the issue of the *Town Planning Review* of October, 1915, shows the state of the literature in this field and indicates that there is quite a wealth of material available to the student of the subject. Professor Abercrombie recognizes the great value of the reports which have been prepared for cities of the United States, many of them consisting of ambitious plans which never will be carried out, but many containing excellent analyses of existing conditions, pointing out defects and suggesting practical remedies. For the effective graphical presentation of information of this kind several of the reports of Mr. John Nolan are especially notable. Miss Kimball's Selected List of References on City Planning, published in 1915 by the National Conference on City Planning, the Check List of References on City Planning published in *Special Libraries Magazine* for May, 1912, and the List of American City Planning Reports, published by the *American City* in 1915, are probably the best available sources of bibliographical information.

The author will not attempt to enumerate the sources of information upon which he has drawn, nor will he attempt to name the many individuals who have so kindly and cheerfully given him valuable information and supplied him with illustrations, acknowledgment of which has been made in the text. To all of them he renews the assurance of his appreciation of their many courtesies.

INDEX

Abercrombie, Prof. Patrick, 12, 413

Accidents:

causes of, 212

in streets, 211

Adams, Thomas, 121, 327, 341, 409

Adickes, Dr. Franz, 59, 266, 386

Adshead, S. D., 135

Albany, N. Y., 153, 346

Alberta Town Planning Law, 333

Alkrington Estates, 304

Allen, V. D., 276

American City Magazine, 407, 414

Amsterdam, 228

Antwerp, 14, 88

cathedral, 167

port of, 57, 58

Architects, Royal Institute of British, 33

Arnold, Bion J., 70

Art commissions, 358

Assessments, 360, 364-378

deferred benefit, 374

for acquiring parks, 369

acquiring streets, 368, 370

building sites, 366

transit lines, 365

grading of, 371

in New York, 375

installment, 375, 377

justice of, 376

Atterbury, Grosvenor, 312

Austria, city planning in, 13

Authorities, local:

in London, 286, 341

Bacon, Henry, 168

Barnes, Cal 171

Bassett, Edward M., 347

Belgium, city planning in, 14

Bennett, Edward II., 56, 146

Berlin, 8, 20, 88, 119, 207, 237, 391

parks, 131, 142

railway terminals, 72

Bigot, M., model of Rome, 3

Billerica Garden Suburb, 312

Birkenhead, port of, 61

Birmingham, Ala., 404

Birmingham, Eng., 141, 198

Block subdivision, 120-129

Bogue, Virgil G., 166

Boston, 119, 291

circumferential streets, 105

overbuilt block in, 40

parks, 135, 136, 139, 143, 184

radial streets, 105

Boulevards. (*See* Parkways.)

Bourneville, 302

Brainard, Owen, 191

Bremen, 320

port of, 57

Bridgeport, 346

Bridges:

Alexandre III, Paris, 173

at Ashokan Reservoir, N. Y., 174

Brooklyn, 172

Cambridge, Boston, 173

High Bridge, New York, 173

old aqueduct, Rio de Janeiro, 173

Washington Bridge, New York, 173

British Town Planning Act, 199, 288,

327, 339

progress under, 340

British Town Planning Institute, 8

Brodie, John A., 98, 146

Brooklyn, 129, 142, 355

marginal railroad, 74

Brown, Arthur, 236

Bruges, 14, 410

Brunner, Arnold W., 10, 257

Brussels, 14, 88, 98, 152

Buda-pest, 142

Buenos Aires, 20, 62, 184

Buffalo, 253

Buildings:

arrangement of, 265

regulations relative to in

Berlin, 267

Birmingham, 273

Boston, 275

Chicago, 275

Cleveland, 276

Cologne, 270

Dusseldorf, 269

Frankfort, 268

Hamburg, 269

Leipzig, 271

Munich, 268

New York, 274, 350

Philadelphia, 275

Rochester, 275

Sheffield, 274

grouping of, at expositions, 17

height of:

regulations relative to in

Berlin, 277

Birmingham, 280

Boston, 281

Buffalo, 282

Charleston, 281

Chicago, 281

Cleveland, 276, 281

Cologne, 279

Dusseldorf, 279

Edinburgh, 280

Fort Wayne, 281

Frankfort, 277

Hamburg, 278

Leipzig, 279

Liverpool, 280

Munich, 278

Buildings:

height of:

regulations relative to in:

New Orleans, 281

New York, 280, 350

Philadelphia, 281

Rochester, 282

Sheffield, 280

Toronto, 282

Washington, 281

use and occupancy, control of in:

Duluth, 284

Los Angeles, 282

Milwaukee, 284

Minneapolis, 284

Seattle, 283

St. Paul, 284

Toronto, 285

wooden in U. S., 24

Burnham, Daniel H., 17, 37, 355

Burns, John, 176

Burton, C. M., 387

Cab-stands:

below street surface, 218

regulation of, 218

Cadbury, George, 302

Calgary Plan Commission, 333

Canadian Conservation Commission,
335

Canberra, Australian capital, 86

Carrère, Jno. M., 396

Central Park, New York, value of, 177

Chamberlain, Joseph, 199

Charlottenburg, 122, 133, 231, 394
overbuilding in, 42

Chicago, 20, 28, 119, 207, 253, 346, 354
exposition of 1893, 17, 150

parks of, 139

plan for improvement of, 37, 184, 377

railway terminals, 68

Cincinnati, 195

Cities:

American, 5

approaches to, 290

limited powers of, 52

population of, 21

Cities:

American:

tall buildings in, 11

ancient, 3

German, population of, 21

medieval, 4

rebuilding in Europe, 6

City Club of New York, 365

City Plan, definition of, 44

City Plan Quarterly, 291

City planning:

definitions of, 9, 10, 11

financing, 25

fundamental principles of, 47

ideals, 23

in Austria, 13

Belgium, 14

England, 14

France, 13

Germany, 12

Italy, 14

South America, 14

Sweden, 12

United States, 14, 15, 17

literature of, 2, 5

need of, for small towns, 22

originality, lack of in, 16

purposes of, 18

Civic centers, 162

at Cleveland, 162, 346

Denver, 181, 346

San Francisco, 164, 346

Seattle, 166

Springfield, Mass., 164, 346

Civil Engineers, Institution of, 384

Clapp, Edwin J., 57

Cleveland, 207

Cologne, 96, 98, 183, 228, 391

Columbia Highway, 292, 295

Corney, Arthur C., 291, 312

Commission government for cities, 322

Commissions, special improvement, 36

Conference of Mayors, 134

Coöperative Tenants' Societies, 304

Corthell, Dr. E. L., 62, 67

Culpin, E. G., 304

Cuxhaven, 57

Davidson, Jas. W., 333

Davies, J. V., 84

Dayton, 323, 408

De Forest, Robt. W., 309

Delhi, Capital of India, 42

Denver:

civic center, 181, 346

parkways of, 180, 184

Des Moines, 323

Detroit, 99, 253, 346, 387

Doubleday, Page & Co., 301

Dresden, 174

Bruhle Terrace, 153, 183

Dublin, 142

Duisburg-Ruhrort, harbor of, 60

Duluth, industrial town near, 191

Dusseldorf, 135, 390, 391

Eberstadt, Professor, 16

Edinburgh, 87, 183

Edinburgh Gazette, 330

Edwards, A. T., 15, 306

Edwards, Percy J., 234, 384

Elevated railroads, 78, 82

Elmes, James, 93

Encroachments:

in European cities, 264

New York, 262

Engineering News, 113

Engineering Record, 164

Engineers, municipal:

opportunity of, 407

responsibility of, 411

scope of work of, 406

England, city planning in, 14

Eno, Wm. P., 216

Equitable building, New York, 36, 399

Essen, 186, 193, 222

government of, 197

Krupp colonies at, 11, 197, 300

plan of, 111

Essen-Nord, sewage plant at, 174

Evelyn, Sir John, 35, 91

Excess condemnation, 379

in Germany, 386

London, 384

Expositions, effect of, 17

- Fairfield, Ala., 192
 Fall River, 193
 Financing (see also Assessments), 360
 debt, 363
 excess condemnation, 379
 Maine road improvements 361
 New York road improvements, 361
 reckless, examples of, 362
 resources of cities, 363
 taxation, 363
 unearned increment tax, 394
 Financing city planning, 25
 Florence, 320
 Ford, George B., 10, 347
 Forest Hills Gardens, 309, 316
 France, city planning in, 13
 Frankfort, 151, 266, 386, 391, 392, 395
 port of, 58, 183
 Galveston, 321
 Garden cities, 299
 criticism of, 306
 financing of, 306-308
 purposes of, 300, 302, 318
 statistics of, 305
 Garden City, New York, 301
 Gary, Indiana, 87
 growth of, 189
 plan of, 190
 Geddes, Professor Patrick, 8
 Genoa, 320
 George, Henry, 397
 German Society of Architects and
 Engineers, 47
 Germany, city planning in, 12, 301
 medieval towns of, 114
 Ghent, 14
 churches of, 167
 congress of cities at, 8, 118
 Glasgow, 141, 236
 Goodrich, E. P., 125
 Gordon, Charles, 29
 Gorst, Sir Jno., 300
 Grand Rapids, 186
 Griffin, Walter B., 86
 Hamburg, 133, 320, 391
 Hamburg, port of, 57, 183
 Hampstead Garden Suburb, 303, 316
 Hanover, 391
 Hanseatic League, 320
 Harper's Magazine, 18, 90
 Harriman, Mrs. E. H., 143
 Haussmann, Baron, 27, 95
 Havre, port of, 60
 Head, Mrs. Betsy, 148
 Heating plant, central, 129
 Hegeman, Dr. Werner, 16, 23, 121, 146
 Height of buildings. (See Buildings.)
 Heights of Building Commission, New
 York, 266, 392
 creation of, 346
 report of, 348
 Hellerau, garden city at, 302
 High buildings, some advantages of, 276
 Highways:
 about cities, 288
 between towns, 288
 French, 289
 New York State, 295
 Ohio, 296
 Hooker, George E., 69
 Housing of the Working Classes Act,
 British, 328, 386
 Howard, Ebenezer, 299, 319
 Howe, Frederic C., 198, 302, 390, 395
 Humphreys, Geo. W., 384
 Hynes, J. P., 10
 Illustrations, selection of, 2
 Industrial towns:
 lack of planning in, 187
 paternalism in, 193
 planning of, considerations which
 should control, 191
 special needs of, 187
 Indianapolis, 225
 Information, sources of, 413
 Inverness, 16
 Italy, city planning in, 14
 Jamaica Bay, New York plan for
 harbor at, 66, 67
 Jefferson, Thomas, 19, 22

- Kansas City, 186
 parks of, 133, 139
 parkways of, 178, 184
 Karlsruhe, 87, 267
 Kensico dam, New York, 174
 Kessler, George E., 146
 Kiau Chow, 395
 Kimball, Theodora, 413
 Koester, Frank, 392
 Krupp Co., colonies of, 197, 300
 Knebworth Estate, 305

 Land policies, municipal, 389
 as found in
 Berlin, 391
 Cologne, 391
 Düsseldorf, 390, 391
 Frankfort, 391, 392
 Germany, 390
 Great Britain, 389
 Hamburg, 391
 Hanover, 391
 Strassburg, 391
 Ulm, 391, 392
 single tax plan, 397
 unearned increment tax, 394
 wild building, prevention of, 393
 Landscape architecture, 134
 profession, beginning of, 130
 Land values in New York, 398
 increase of, 402
 Lay, Chas. D., 134, 243
 Leavitt, Chas. W., 302
 Legislation:
 Alberta, Canada, 333, 336
 British Town Planning Act, 327
 city charters, 321
 commission government, 321
 commission-manager plan, 323, 407
 Dayton charter, 324
 Great Britain, 17
 "Lex Adickes," 386
 Liverpool, 328, 332
 New Jersey, 323, 336
 New York City, 346-352
 New York State, 336, 379
 Leipzig, 8, 133

 L'Enfant, 22, 26, 91, 151
 Letchworth, 198, 300, 307
 Lever, Sir Wm., 302
 Lewis, Harold M., 113
 Lighting:
 of buildings, 240
 streets, 240
 Lincoln, England, 248
 Liverpool, 133, 146, 237, 307, 328, 332
 port of, 61
 ring street, 98
 London, 88, 119, 122, 228, 339
 Lincoln's Inn Fields, 29
 Local Government Board, 327
 omnibus routes, 202
 parks of, 141, 142
 pipe subways, 234
 plans for rebuilding, 91
 port of, 60, 61, 183
 Strand-to-Holborn Improvement, 29,
 183, 384
 Tilbury docks, 61
 Town Planning Conference, 8, 35
 Traffic Branch, Board of Trade, 55,
 201, 202
 traffic:
 increase of, 202
 Royal Commission on, 106
 tramway system, 202
 London County Council, 32, 132, 204,
 385
 London Gazette, 330
 London General Omnibus Co., 206
 London Town Planning Conference,
 proceedings of, 101, 121, 146, 160,
 Los Angeles, 405
 additions to, 65, 294
 harbor improvements at, 64
 Lowell, Guy, 161
 Lübeck, 320
 Lyons, 131, 186

 Maltbie, Milo R., 55, 76
 Manchester, port of, 61, 186
 Mannheim, 87
 Massachusetts Homestead Commission,
 40, 298, 313

- Marseilles, 331
 McAneny, George, 9, 346
 McElroy, Samuel, 115, 117
 McKim, Mead & White, 161
 Meryweather, H. F., 181
 Metropolitan Board of Works, London, 31
 Milan, 236
 Minneapolis, 186, 293
 Monuments, 149
 Arc de Triomphe, Paris, 152
 Brandenburg Gate, Berlin, 171
 Memorial Arch, Brooklyn, 171
 Washington Arch, New York, 171
 Moody, Walter D., 354
 Moscow, 96, 98, 119
 Motor vehicles:
 increase of, 208
 parking of, 217
 Munich, 267
 Municipal Engineers of the City of
 New York, proceedings of, 375

 Naples, 28
 National Conference on City Planning,
 8, 55, 84, 125, 333, 335, 357,
 359
 National Highway Protective Ass'n,
 211
 Nettlefold, J. S., 199
 New England village green, 87, 167
 New Haven, 346
 New York, 119, 126, 207, 225, 228, 321,
 338, 354
 city planning exhibition at, 9
 control of traffic in, 213
 courthouse site, 162
 distribution of parks in, 133
 Grand Central Terminal, 74
 Manhattan Borough, 28
 Manhattan, plan of, 88
 Minetta street problem, 41
 municipal office building, 161
 parks of, 142
 parkways of, 139
 Pennsylvania Railroad Station, 74
 railway terminals, 74

 New York:
 rapid-transit system of, 81, 83, 184
 Seventh avenue extension, 37
 tall buildings in, 12, 36
 water supply, 184
 New York State Barge Canal Terminal
 Commission, 59, 60
 New York State road system, 295
 New York Times, 237
 New York Tribune, 338
 Nolen, John, 414
 Nottingham, 235
 Nuremberg, 87

 Oakland, Cal., harbor improvements,
 64
 Ohio, county road system, 296
 Olmsted Brothers, 232
 Olmsted, Frederick L., 171, 311
 Omaha, 16, 186
 Ormond, Wm. C., 375

 Palisades Interstate Park, 143
 Paris, 27, 88, 98, 119, 122, 152, 207
 beautification of, 183
 disturbance of streets in, 237
 parks of, 131, 142
 plan of, 95
 sewers of, 236
 Parker, Barry, 300
 Parks:
 ancient cities, in, 130
 Charles River Basin, Boston, 145
 classes of, 136
 economic values of, 177
 expert advice in selection of, 140
 land available for, 138
 overdevelopment of, 135
 Palisades Interstate, 143
 relation to street system, 138
 royal pleasure grounds, as, 130
 secured by gift, 141
 small, 145
 statistics of, 132
 Strathcona, 145
 system, need of, 138
 time to acquire, 135

Parkways:

- assessments for, 178
- Bronx River, 143
- Brooklyn, 178
- Denver, 180, 184
- Essex County, N. J., 232
- Fairmount, Philadelphia, 172
- Kansas City, 178
- Philadelphia, 119, 153, 207, 217, 257, 291
 - block subdivision in, 127
 - Fairmount Parkway, 172
 - parks of, 143
- Pittsburgh, 16, 186, 193, 346
 - "Hump," 39
- Playgrounds, 146
 - local benefits of, 147
- "Places," in European cities, 224
- Population:
 - of American cities, 20, 404
 - German cities, 20
 - German Empire, 20
 - United States, 20
- rural, 19
- urban, 19
- Port Sunlight, 302
- Portland, Ore., 292
 - fire engine house in, 170
 - harbor improvements, 64
- Pray, Prof. Jas. Sturgis, 413
- Pratt, Fredk. B., 355
- Prefect of the Seine, 237
- Prince Rupert, harbor improvements, 64
- Public buildings, 150
 - along waterfront, 153
 - grouping of. (*See* Civic centers.)
 - location of, 152
 - minor, 169
 - New York courthouse, 162
 - New York municipal office building, 161
 - railway stations, 155
 - schools, 169
 - Versailles, Chateau at, 152
 - Washington, 168
- Public Service Commission of New York, 207, 250

- Pullman, 193, 248
- Pumping stations, 173
- Purpose of volume, I, 413

Railroad crossings, 247

- dangers of, 249
- laws governing, 250
 - Connecticut, 250
 - Illinois, 251
 - Indiana, 251
 - Iowa, 251
 - Maine, 251
 - Massachusetts, 251
 - Michigan, 252
 - Minnesota, 252
 - New Hampshire, 252
 - New Jersey, 252
 - New York, 249
 - Ohio, 252
 - Pennsylvania, 252
 - Rhode Island, 252
 - Vermont, 253

bridges at:

- clearance of, 254
- design of, 256

Railroads:

- entering cities, 247
- in open cuts, 79
 - streets, cost of, 84, 85
- street surface:
 - overhead trolley, 239
 - position of, 231
 - underground contact, 239

Railroad stations and terminals:

- Antwerp, 160
- Barstow, Cal., 171
- Chicago, 158
- Edinburgh, 158
- effect of electrical operation, 155
- Frankfort, 160
- location of, 155
- London, 158
- New York, 155
- San Diego, 171
- St. Louis, 158
- Washington, 158
- Reade, Chas. C., 306

- Reading, 346
 Reservoirs, 173
 Restrictions. (*See* Buildings, Arrangement of, Height of, Use and Occupancy of.)
 Forest Hills Gardens, 317
 Hampstead Garden Suburb, 316
 meaning of, 260
 St. Louis "places," 245
 Rey, A. Augustin, 118, 160, 391
 Riley, W. E., 35
 Rio de Janeiro, 20, 63, 153, 184
 Road Board of Great Britain, 204
 Road Congress, International, at London, 240, 410
 Roads. (*See* Highways.)
 disregard of old, 116, 117
 importance of old, 103, 117
 old, to be widened, 104
 Roadway widths, 226
 for first improvement, 227
 Robinson, Charles M., 10, 97, 242
 Rochester, N. Y., 99, 293, 346
 Rome, model of, 3
 Rothenburg, 16
 Ruislip-Northwood scheme, 341

 Sage Foundation Homes Company, 309, 315
 Sage, Mrs. Russell, 309
 San Diego:
 harbor improvements, 65
 railway station, 171
 San Francisco, 313
 civic center, 164
 harbor improvements, 64
 parkways, 139
 Santa Barbara, Cal., post office at, 170
 Satellite cities, 188
 Schmidt, Dr. R., 111, 198
 Seattle, 217, 346, 404
 civic center, 166
 harbor improvements, 64
 Sharp, Dr. Clayton, H., 240
 Shaw, Dr. Albert, 97, 141
 Sheffield, 186

 Sidewalks, width of, 226
 Single Tax Review, 398, 400
 Snyder, George D., 82
 Solotaroff, Wm., 243
 South America, city planning in, 14
 Special Libraries Magazine, 414
 Springfield, Mass., civic center, 164, 346
 St. Helens, 236
 St. Louis, 207, 244
 State institutions, location of, 298
 Statistics, accuracy of, 7
 Stewart, Alex. T., 301
 Strand-to-Holborn Improvement, London, 28
 carried out, 34
 cost, 34
 finally authorized, 34
 first proposed, 31
 Strassburg, 391
 Street details:
 in France, 222
 Germany, 222
 irregularity of, 221
 standardization of, 221
 Street traffic. (*See* Traffic.)
 Street widths:
 Berlin, prescribed for, 107
 German cities, secondary, prescribed for, 107
 London, prescribed for, 106
 Streets:
 alignment of, 108, 110, 114
 arterial, 106
 cul-de-sac, 119
 diagonal, 102
 fixed by private developments, 109
 gridiron plan of, 83, 102
 junctions, 109, 111, 224, 225
 lamp standards in, 240
 lighting of, 240
 minor, 108
 offsets in, 111
 orientation of, 118
 planting in, 242
 purpose of, 200
 secondary, 106
 signs indicating, 241

Streets:

- trees in, 242
- wide, subdivision of, 230, 233

Strunsky, Simeon, 89

Sub-surface structures, 233

in New York, 233, 235

subways for:

- Glasgow, 236
- London, 234
- Milan, 236
- Nottingham, 235
- Paris, 236
- St. Helens, 236

Surveyor, functions of, 409

Sweden, city planning in, 12

Tacoma, harbor improvements, 64

Taft, William H., 22, 26, 378

Taxes, Dept. of, New York, 401

Taylor, Graham R., 188

Tenant Coöperators, Ltd., 305

Topography, importance of, 103

Toronto, parks of, 141

Town Planning Review, 12, 118, 240,
306, 327, 340

Traffic:

- accidents due to, 211
- alien, 200
- control of, 212
 - block system, 213
 - gyratory system, 216
- delays to, 175, 182
- horse-drawn, 208
- London, 201
- motor vehicle, 208
- omnibus vs. tramway, 206
- problems of, 201
- relation to city planning, 218
- various cities, 207

Triggs, Inigo, 216

Turner, Daniel L., 84

Tuttle, Arthur S., 373

Ulm, 391, 392

United States, city planning in, 14, 15

United States Steel Corporation, 189

Unwin, Raymond, 4, 101, 102, 108,
216, 222, 300

Vancouver, 145

harbor improvements, 64

Vehicles:

- flexibility of, 209
- relative obstruction by, 210

Venice, 320

Versailles, 152

Verstraete, R., 410

Victoria, B. C., 145

harbor improvements, 64

Vienna, 20, 28, 96, 98, 119, 207

ring street, 97, 183

Waite, H. M., 408

Wales, Salem H., 177

Walker, Jas. B., 250

Washington, 22, 26, 86, 91, 99, 119
225, 378

Lincoln Memorial, 168

public buildings of, 168

scale of, 102, 134

Washington, George, 22

Weyl, Walter E., 18

White, Alfred T., 355

Whitten, Dr. Robt. H., 357

Williams, Frank B., 392

Wirt, Wm. A., 191

Woodlands Mining Village, 305

Woodward, Prof. John, 93

World Building, New York, 398

Wren, Sir Christopher, 35, 91

Zoning system, 266

- Reading, 346
 Reservoirs, 173
 Restrictions. (*See* Buildings, Arrangement of, Height of, Use and Occupancy of.)
 Forest Hills Gardens, 317
 Hampstead Garden Suburb, 316
 meaning of, 260
 St. Louis "places," 245
 Rey, A. Augustin, 118, 160, 391
 Riley, W. E., 35
 Rio de Janeiro, 20, 63, 153, 184
 Road Board of Great Britain, 204
 Road Congress, International, at London, 240, 410
 Roads. (*See* Highways.)
 disregard of old, 116, 117
 importance of old, 103, 117
 old, to be widened, 104
 Roadway widths, 226
 for first improvement, 227
 Robinson, Charles M., 10, 97, 242
 Rochester, N. Y., 99, 293, 346
 Rome, model of, 3
 Rothenburg, 16
 Ruislip-Northwood scheme, 341

 Sage Foundation Homes Company, 309, 315
 Sage, Mrs. Russell, 309
 San Diego:
 harbor improvements, 65
 railway station, 171
 San Francisco, 313
 civic center, 164
 harbor improvements, 64
 parkways, 139
 Santa Barbara, Cal., post office at, 170
 Satellite cities, 188
 Schmidt, Dr. R., 111, 198
 Seattle, 217, 346, 404
 civic center, 166
 harbor improvements, 64
 Sharp, Dr. Clayton, H., 240
 Shaw, Dr. Albert, 97, 141
 Sheffield, 186

 Sidewalks, width of, 226
 Single Tax Review, 398, 400
 Snyder, George D., 82
 Solotaroff, Wm., 243
 South America, city planning in, 14
 Special Libraries Magazine, 414
 Springfield, Mass., civic center, 164, 346
 St. Helens, 236
 St. Louis, 207, 244
 State institutions, location of, 298
 Statistics, accuracy of, 7
 Stewart, Alex. T., 301
 Strand-to-Holborn Improvement, London, 28
 carried out, 34
 cost, 34
 finally authorized, 34
 first proposed, 31
 Strassburg, 391
 Street details:
 in France, 222
 Germany, 222
 irregularity of, 221
 standardization of, 221
 Street traffic. (*See* Traffic.)
 Street widths:
 Berlin, prescribed for, 107
 German cities, secondary, prescribed for, 107
 London, proposed for, 106
 Streets:
 alignment of, 108, 110, 114
 arterial, 106
 cul-de-sac, 119
 diagonal, 102
 fixed by private developments, 109
 gridiron plan of, 83, 102
 junctions, 109, 111, 224, 225
 lamp standards in, 240
 lighting of, 240
 minor, 108
 offsets in, 111
 orientation of, 118
 planting in, 242
 purpose of, 200
 secondary, 106
 signs indicating, 241

Streets:

- trees in, 242
- wide, subdivision of, 230, 233
- Strunsky, Simeon, 89
- Sub-surface structures, 233
 - in New York, 233, 235
 - subways for:
 - Glasgow, 236
 - London, 234
 - Milan, 236
 - Nottingham, 235
 - Paris, 236
 - St. Helens, 236
- Surveyor, functions of, 409
- Sweden, city planning in, 12
- Tacoma, harbor improvements, 64
- Taft, William H., 22, 26, 378
- Taxes, Dept. of, New York, 401
- Taylor, Graham R., 188
- Tenant Coöperators, Ltd., 305
- Topography, importance of, 103
- Toronto, parks of, 141
- Town Planning Review, 12, 118, 240, 306, 327, 340
- Traffic:
 - accidents due to, 211
 - alien, 200
 - control of, 212
 - block system, 213
 - gyratory system, 216
 - delays to, 175, 182
 - horse-drawn, 208
 - London, 201
 - motor vehicle, 208
 - omnibus vs. tramway, 206
 - problems of, 201
 - relation to city planning, 218
 - various cities, 207
- Triggs, Inigo, 216
- Turner, Daniel L., 84

Tuttle, Arthur S., 373

- Ulm, 391, 392
- United States, city planning in, 14, 15
- United States Steel Corporation, 189
- Unwin, Raymond, 4, 101, 102, 108, 216, 222, 300
- Vancouver, 145
 - harbor improvements, 64
- Vehicles:
 - flexibility of, 209
 - relative obstruction by, 210
- Venice, 320
- Versailles, 152
- Verstraete, R., 410
- Victoria, B. C., 145
 - harbor improvements, 64
- Vienna, 20, 28, 96, 98, 119, 207
 - ring street, 97, 183
- Waite, H. M., 408
- Wales, Salem H., 177
- Walker, Jas. B., 250
- Washington, 22, 26, 86, 91, 99, 119, 225, 378
 - Lincoln Memorial, 168
 - public buildings of, 168
 - scale of, 102, 134
- Washington, George, 22
- Weyl, Walter E., 18
- White, Alfred T., 355
- Whitten, Dr. Robt. H., 357
- Williams, Frank B., 392
- Wirt, Wm. A., 191
- Woodlands Mining Village, 305
- Woodward, Prof. John, 93
- World Building, New York, 398
- Wren, Sir Christopher, 35, 91
- Zoning system, 266